Electronic Supplementary Material (ESI) for Organic Chemistry Frontiers.


# Redox-neutral access to 3,3’-disubstituted oxindoles via radical coupling reactions

Cong Lu, Dong Jing, Yanlin Shen, Jiajing Luo and Ke Zheng*

Key Laboratory of Green Chemistry & Technology, Ministry of Education, College of Chemistry, Sichuan University, Chengdu 610064, P. R. China.
E-mail: kzheng@scu.edu.cn

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## 1 Materials and Methods

### 1.1 Solvents, Reagent and Analytical Instrumentation

Tetrahydrofuran (THF) and Dichloromethane ($CH_2Cl_2$) were freshly distilled over sodium block and calcium hydride under a $N_2$ atmosphere prior to each use. Tetrabutylammonium iodide ($^nBu_4NI$, 99%+) was obtained from commercial vendors and used as received. Other commercial reagents were purchased from Adamas, TCI, Aldrich and Alfa. and used without further purification. $^1H$ NMR and $^{13}C$ NMR data were recorded on Bruker AVANCE III HD-400, spectrometers using $CDCl_3$ or DMSO-d6 as solvents, typically at 20–23 °C. Chemical shifts (δ) are reported in ppm relative to the residual solvent signal (δ 7.26 for $^1H$ NMR, δ 77.16 for $^{13}C$ NMR in $CDCl_3$, δ 2.50 for $^1H$ NMR, δ 39.52 for $^{13}C$ NMR in DMSO-d6). $^{19}F$ NMR spectra were taken on a Bruker AVANCE III HD (400 MHz) instrument. Data for $^1H$ NMR are reported as follows: chemical shift (δ ppm), integration, multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet, br = broad), and coupling constant (Hz). Data for $^{13}C$ NMR are reported in terms of chemical shift and no special nomenclature is used for equivalent carbons. High-resolution mass spectra (HRMS) were recorded on a UPLC of Thermo Q Exactive Focus. Experimental data of crystallography was recorded on a Bruker D8 Photon II. UV-Vis spectra experiment was measured on a Thermo Scientific NanoDrop 2000C spectrophotometer.

### 1.2 Experimental Procedures

Reactions were carried out in oven-dried glassware under a positive pressure of $N_2$ (≧99.99%) in freshly distilled solvents using standard Schlenk techniques. In the process of reaction, Schlenk tube was cooled by circulating water to ensure that transformation proceed at room temperature. Reaction progress was monitored using a combination of LC (Waters, alliance e2695) analysis and thin-layer chromatography (TLC, glass backed, extra hard layer, 60 Å, 250 μm thickness, F254 indicator). Flash column chromatography was performed with glass columns and the purification of products was accomplished using forced-flow chromatography on Silica Gel (200-300 mesh). Organic solutions were concentrated under reduced pressure on an EYELA N-1300 rotary evaporator.

## 2 Standard Reaction Setup

The setup (shown below) is employed to photochemical organic synthesis reaction, which is made up of separable base and reaction hole. The integrated light panel with certain wavelength can be embedded into the sliding groove of the base. Due to the hollow design, the reaction can be kept at an ideal temperature through cold or hot medium. In a typical reaction, Schlenk tube was inserted into the hole and the reaction mixture is irradiated under 10 W LEDs light with 1.0 cm distance.

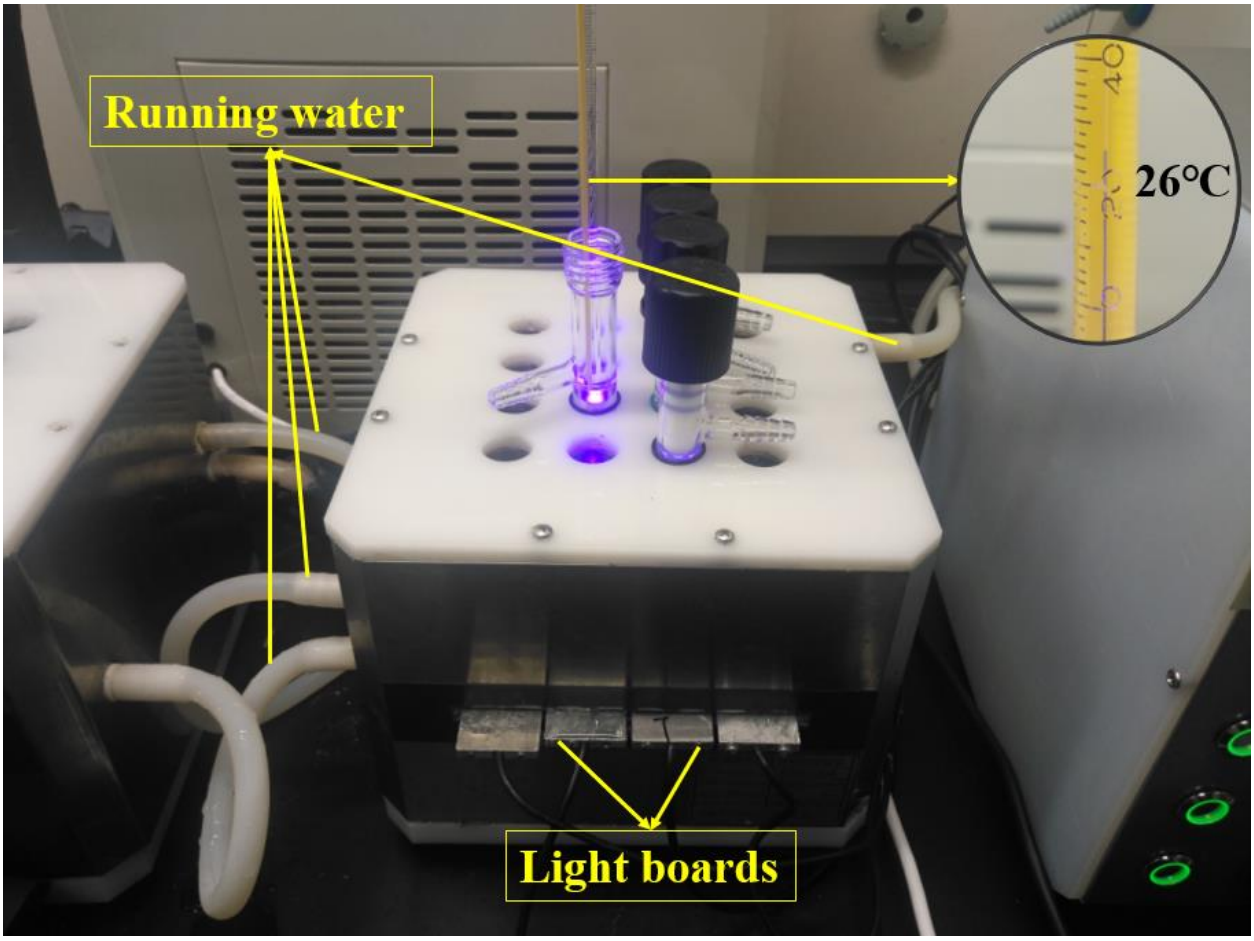



**Figure S1.**

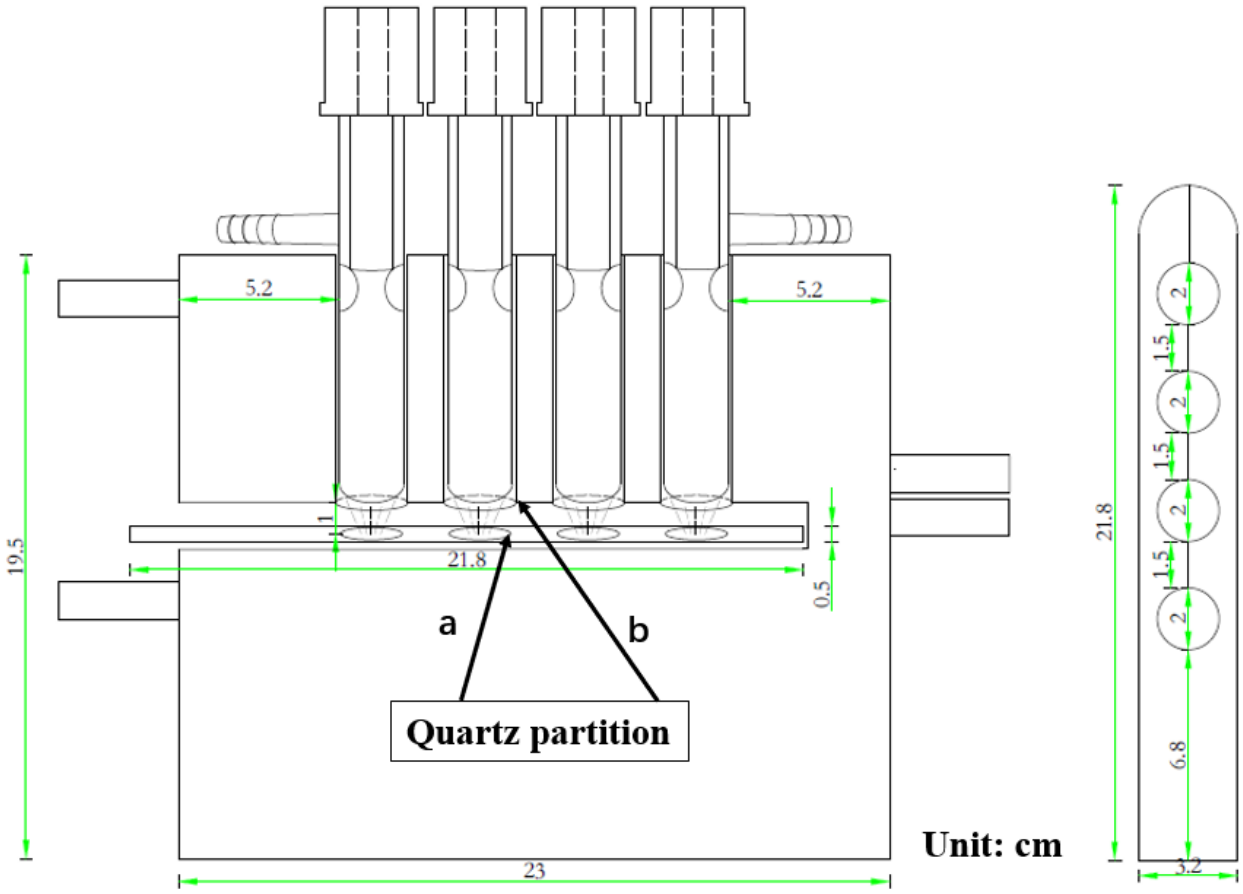



**Figure S2.** Schematic photoreactor and light board.

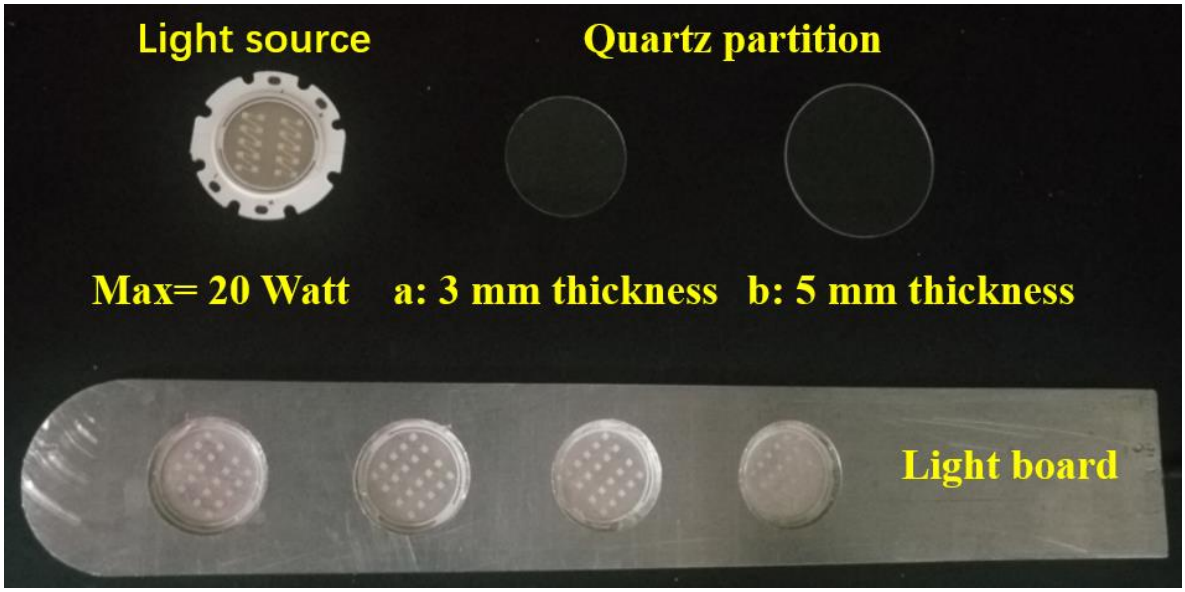
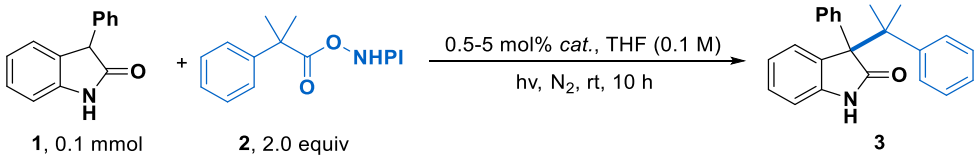



**Figure S3.**

## 3 Reaction Optimization

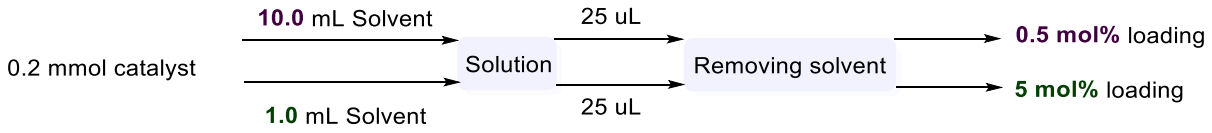



To an oven-dried 10-mL Schlenk tube equipped with a stirrer bar were added *3*-substituted oxindole **1** (0.1 mmol, 20.9 mg) and redox-active ester **2** (0.2 mmol, 2.0 equiv). In glove box, the corresponding catalyst (catalyst was formulated as 0.02 mol/L in certain solvent) and freshly distilled THF were added. Continuous circulating water was introduced to ensure that the reaction is carried out at room temperature. The reaction mixture was irradiated using 10 W LEDs with corresponding wavelength for 10 hours. Upon complete consumption of *3*-substituted oxindoles, the mixture was concentrated and purified by column chromatography to afford pure products.

Since the catalyst loading is very low, most of them are dissolved in certain solvent.

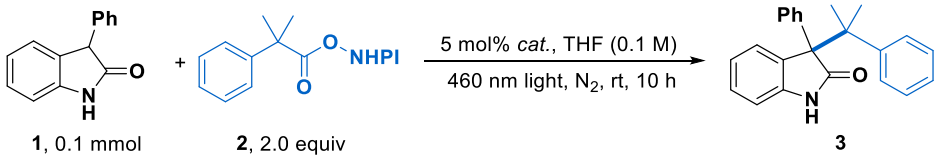
**The General Preparation for Catalyst Solution:**

**Table S1.**




| Catalyst | Solvent | Catalyst | Solvent |
|---|---|---|---|
| $^{n}Bu_4NI$ | DCM | NaCl | $H_2O$ |
| $^{n}Bu_4NCl$ | DCM | NaI | $CH_3CN$ |
| $^{n}Bu_4NBr$ | DCM | KI | $CH_3CN$ |
| $Et_4NI$ | DCM | $NH_4I$ | $CH_3CN$ |
| $^{n}Bu_4NBF_4$ | DCM | $^{n}Bu_4NI_3$ | DCM |
| $^{n}Bu_4NPF_6$ | DCM | $I_2$ | DCM |

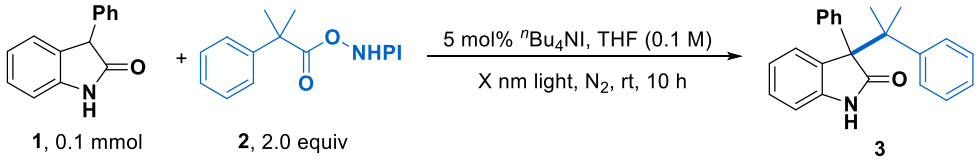
**Table S2.** Evaluation of catalyst




| Entry | Catalyst | Yield (%) |
|---|---|---|
| **1** | **$^{n}$Bu$_4$NI** | **65** |
| 2 | $^{n}$Bu$_4$NBF$_4$ | NR |
| 3 | $^{n}$Bu$_4$NPF$_6$ | NR |
| 4 | NH$_4$I | NR |
| 5 | I$_2$ | Trace |

**Conditions**: 0.1mmol **1**, 2.0 equiv **2**, 5 mol% catalyst, 1.0 mL THF, 460 nm light, $N_2$ atmosphere, rt, 10 h. Isolated yield. NR = no reaction.

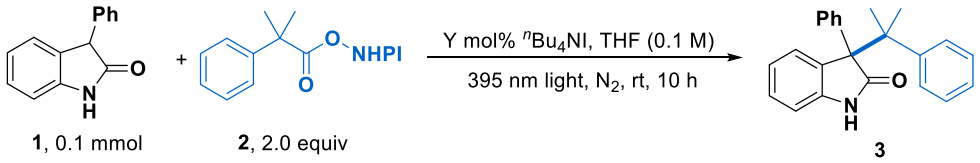
**Table S3.** Evaluation of light source




| Entry | Light source (X nm) | Yield (%) |
|---|---|---|
| 1 | 365 | 49 |
| 2 | 385 | 62 |
| **3** | **395** | **75** |
| 4 | 425 | 71 |
| 5 | 445 | 67 |
| 6 | 460 | 65 |
| 7 | 525 (24 h) | 37 |
| 8 | CFL (24 h) | 63 |

**Conditions:** 0.1mmol **1**, 2.0 equiv **2**, 5 mol% $^{n}$Bu$_4$NI, 1.0 mL THF, light, $N_2$ atmosphere, rt, 10 h. Isolated yield.

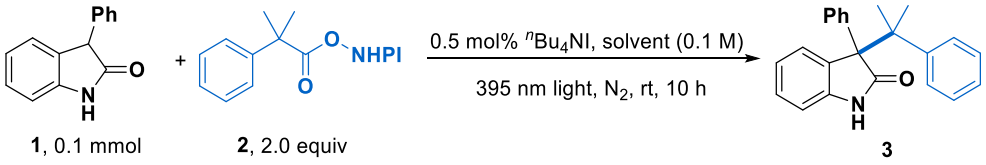
**Table S4.** Evaluation of catalyst loading




| Entry | Loading (Y mol%) | Yield (%) |
|---|---|---|
| 1 | 10 | 71 |
| 2 | 5 | 75 |
| 3 | 2 | 78 |
| 4 | 1 | 85 |
| **5** | **0.5** | **92** |
| 6 | 0.2 | 80 |

**Conditions**: 0.1mmol **1**, 2.0 equiv **2**, Y mol% $^{n}Bu_4NI$, 1.0 mL THF, 395 nm light, $N_2$ atmosphere, rt, 10 h. Isolated yield.

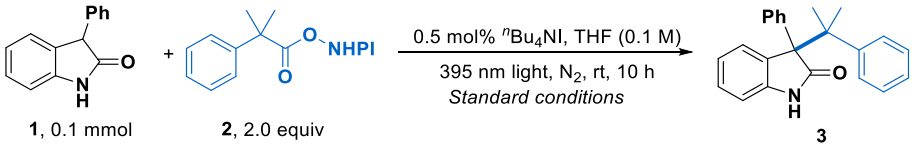
**Table S5.** Evaluation of solvent




| Entry | Solvent (1.0 mL) | Yield (%) |
|---|---|---|
| 1 | DCM | 83 |
| 2 | DCE | 80 |
| 3 | Toluene | 55 |
| 4 | $CH_3CN$ | 59 |
| 5 | DMF | 61 |
| 6 | DMSO | 47 |
| 7 | $CH_3OH$ | 21 |

**Conditions**: 0.1mmol **1**, 2.0 equiv **2**, 0.5 mol% $^{n}Bu_4NI$, 1.0 mL solvent, 395 nm light, $N_2$ atmosphere, rt, 10 h. Isolated yield.

**Table S6:** Control experiment

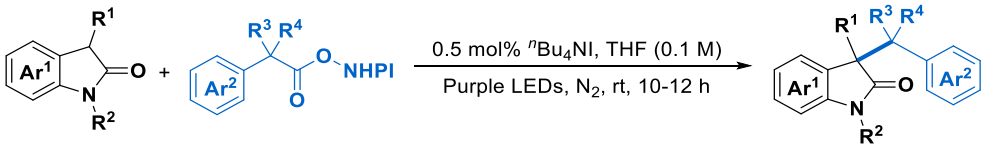



| Entry | Variation of standard conditions | Yield (%) |
|---|---|---|
| **1** | **none** | **92** |
| 2 | $^{n}Bu_4NCl$ instead of $^{n}Bu_4NI$ | 87 |
| 3 | $^{n}Bu_4NBr$ instead of $^{n}Bu_4NI$ | 85 |
| 4 | $^{n}Bu_4NI_3$ instead of $^{n}Bu_4NI$ | 67 |
| 5 | $Et_4NI$ instead of $^{n}Bu_4NI$ | 86 |
| 6 | tetrahexylammonium iodide instead of $^{n}Bu_4NI$ | 87 |
| 7 | NaI instead of $^{n}Bu_4NI$ | 79 |
| 8 | $K_2CO_3$ (0.5 mol%) instead of $^{n}Bu_4NI$ | 32 |
| 9 | $K_2CO_3$ (2.0 equiv) instead of $^{n}Bu_4NI$ | 67 |
| 10 | $Cs_2CO_3$ (2.0 equiv) instead of $^{n}Bu_4NI$ | 88 |
| 11 | KI instead of $^{n}Bu_4NI$ | 70 |
| 12 | sunlight instead of 395 nm light | 85* |

Conditions: 0.1mmol **1**, 2.0 equiv **2**, 0.5 mol% catalyst, 1.0 mL THF, 395 nm light, $N_2$ atmosphere, rt, 10 h. Isolated yield.

*With 10 mol% catalyst.

## 4 General Procedure




**Procedure A ($R^1$ = Ar)**: To an oven-dried 10-mL Schlenk tube equipped with a stirrer bar were added 3-arylindolin-2-one (0.1 mmol) and redox active ester (0.2 mmol, 2.0 equiv). In glove box, 25 uL (0.5 mol%) $^n$Bu$_4$NI (formulated as 0.02 mol/L in DCM) and 1.0 mL freshly distilled THF were added. Continuous circulating water was introduced to ensure that the reaction is carried out at room temperature. The reaction mixture was irradiated using 10 W LEDs with corresponding wavelength for 10-12 hours. Upon complete consumption of 3-arylindolin-2-one, the mixture was concentrated and purified by column chromatography to afford corresponding products.

**Procedure B ($R^1$ = alkyl)**: To an oven-dried 10-mL Schlenk tube equipped with a stirrer bar were added 3-alkylindolin-2-one (0.1 mmol) and redox active ester (0.2 mmol, 2.0 equiv). In glove box, 25 uL (5 mol%) catalyst ($^n$Bu$_4$NBr formulated as 0.2 mol/L in DCM) and 1.0 mL freshly distilled THF were added. Continuous circulating water was introduced to ensure that the reaction is carried out at room temperature. The reaction mixture was irradiated using 10 W LEDs with 445 nm wavelength for 48 hours. Upon complete consumption of RAEs, the mixture was concentrated and purified by column chromatography to afford corresponding products.

**Note:** if the PhthH was contained in product, pretreatment was employed upon completion according to reported literature[1]. First, solvent was removed under reduced pressure and residue was dissolved with EtOAc, and then washed with $K_2CO_3$ (10% in water) for three times.

## 5 UV-Vis Absorption Spectroscopic Measurements

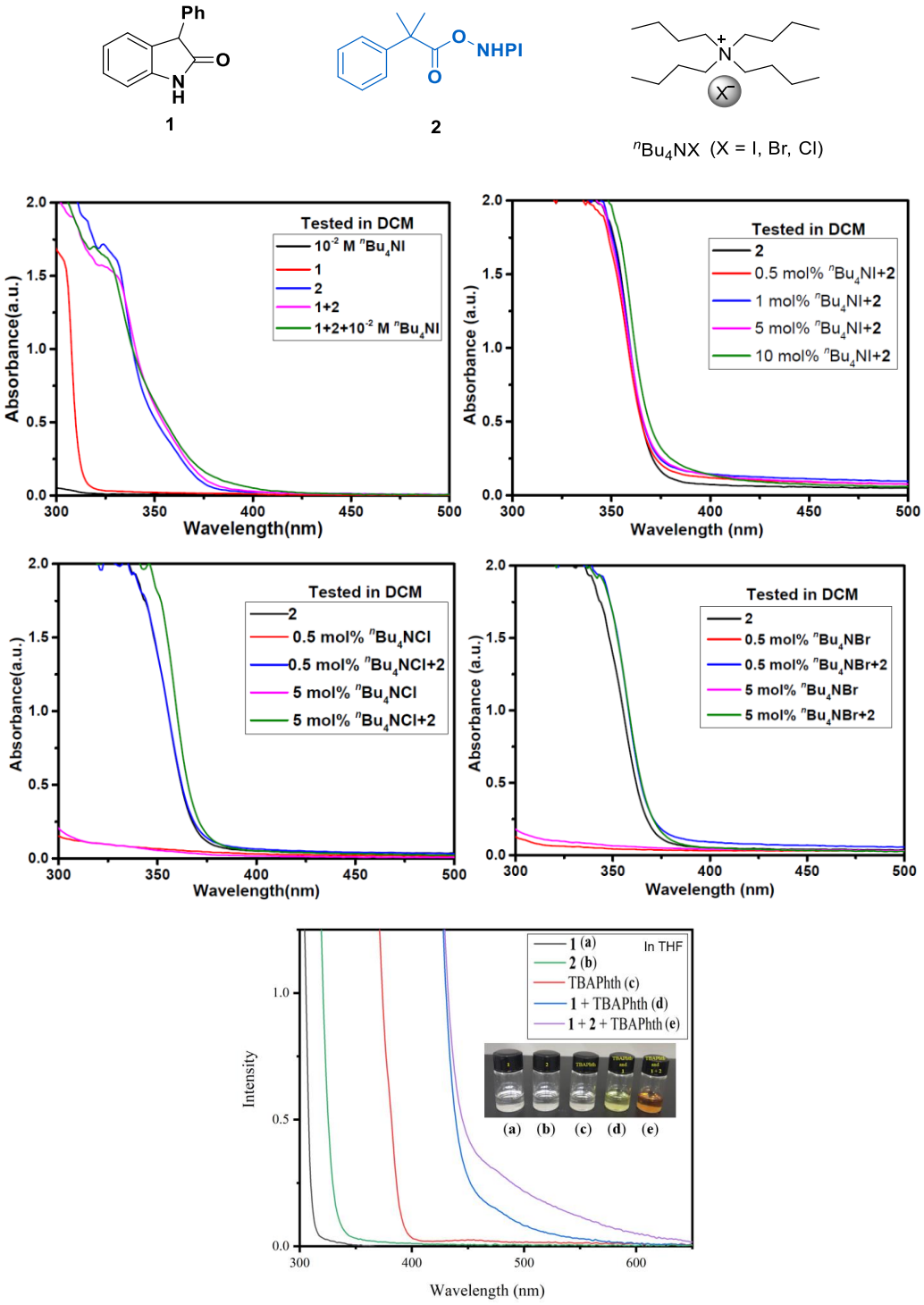


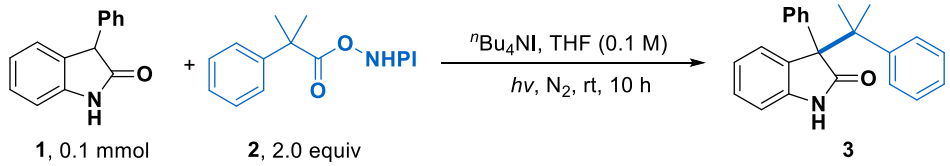

**Figure S4.** UV-Vis Absorption.

## 6 Control Experiments

### 6.1 Crucial Factors for the Radical-Radical Coupling Reaction

To investigate the crucial factors for this efficient transformation, the following procedure for the radical-cross-coupling was designed. The model reaction was carried out under the irradiation under 395 nm light by changing reaction conditions. Considering the interference of substrate absorption on the nature of this reaction, similar reaction was subjected to 460 nm light and sunlight. The results were depicted in **Table S7**.

**Table S7.** Control experiments




**1**, 0.1 mmol  **2**, 2.0 equiv  **3**

| Deviations | Yield (%) | | |
|---|---|---|---|
| | 395 nm light | 460 nm light | Sunlight* |
| None | 92 | 65 | 85 |
| W/o light | 0 | 0 | 0 |
| W/o $^n$Bu$_4$NI | 28 | 0 | <10 |
| air | trace | 0 | 0 |

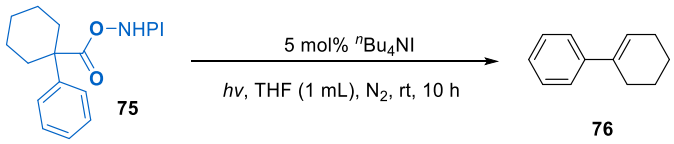
**Conditions**: 0.5 mol% $^n$Bu$_4$NI was employed under irradiations of 395 nm light and 5.0 mol% $^n$Bu$_4$NI was employed under irradiations of 460 nm light. W/o = without. *With 10 mol% $^n$Bu$_4$NI. Isolated yield.

Among above conditions tested, $^n$Bu$_4$NI, light and inert atmosphere are all crucial factors for high transformation. When this reaction was carried out by using blue light (460 nm), it can eliminate the interference of substrate absorption (the redox-active ester has tail absorption around 400 nm), and product **3** could only be obtained in the presence of $^n$Bu$_4$NI. These results indicated that the $^n$Bu$_4$NI, light, and N$_2$ atmosphere were all crucial to facilitating this transformation.

### 6.2 The Control Experiment of RAEs

To gain insight about this reaction, the consumption experiment of RAEs in the absence of substrate **1** was tested. The RAEs were complete depletion under standard conditions for 4 hours. As the reason mentioned above (the redox-active ester has tail absorption around 400 nm), the control experiments were carried out under both 460 nm and 395 nm, respectively. For the convenience of monitoring, substrate **75** was selected and the results are shown in **Table S8**.

**Table S8.** Control experiments




| Deviations | Conversion | |
|---|---|---|
| | 395 nm light | 460 nm light |
| None | 100% (73% of **75**) | 100% (75% of **75**) |
| W/o light | 0 | 0 |
| W/o $^{n}Bu_4NI$ | <25% | <5% |
| air | <25% | 0 |

Monitoring by TLC, collecting products or recycling substate. W/o = without.

Compared to the low conversion of **75** was detected without light or $^{n}Bu_4NI$ (**Table S8**), the elimination product **76** was observed in high yield (75%) with high conversion of **75** with using $^{n}Bu_4NI$ as a catalyst under irradiation. When TBAPhth (5 mol%) was used instead of $^{n}Bu_4NI$, only trace amount of **76** was detected (Figure S5). These results indicated that the formation of charge transfer complexes of $^{n}Bu_4NI$ and redox-active ester can accelerate the decomposition of **75** to form the base $Phth^{-}$, $CO_2$ and radicals vis SET process.

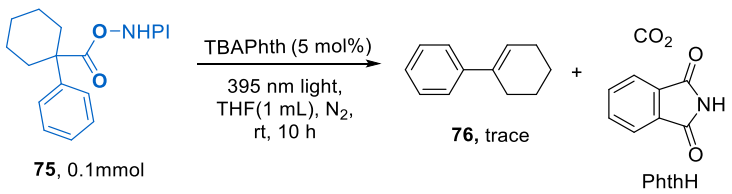
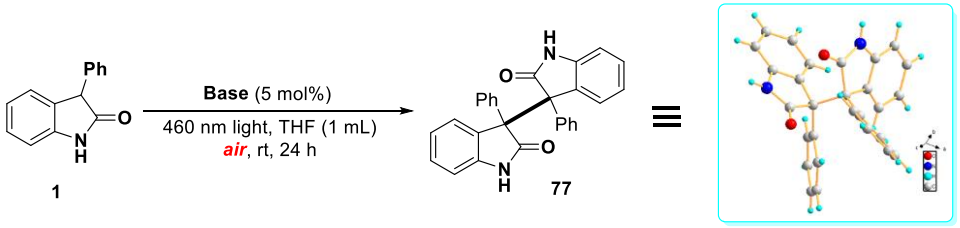



**Figure S5**. Control experiments

### 6.3 The Control Experiment of Oxindole 1

**Table S9.** Control experiments




| Deviations | Yield | |
|---|---|---|
| | 395 nm light | 460 nm light |
| None | 92% | 90% |
| W/o light | 0 | 0 |
| W/o Base (TBAPhth) or $^{n}Bu_4NI$ | Trace | 0 |
| $^{n}Bu_4NI$ instead of Base | 90% | 88% |
| $N_2$ | 0 | 0 |

**Conditions**: 12 h for 395 nm light and 24 h for 460 nm light. isolated yield. W/o = without.

92% yield of product **77** derived from the dimerization of the persistent oxindole radical was identified by using $O_2$ as an electron acceptor to trigger the SET process, and the control experiments confirmed the essential roles of base TBAPhth or $^{n}Bu_4NI$, the electron acceptor $O_2$, and irradiation in the reaction. Compared to shorter wavelength (395 nm light, 12 h), the complete conversion of substrate **1** needs to extend time to 24 h when blue light source was employed.

### 6.4 Radical Trapping Experiment under Standard Conditions

To verify radical mechanism of this transformation, the radical trapping experiment was carried out as shown in **Figure S6**. When 6.0 equiv TEMPO was added to this system, no cross-coupling product **3** was detected and homocoupling product **77** (dimer of **1)** and radical trap product **78** were isolated in high yields, providing direct evidence for the formation of a transient benzyl radical by SET process and a stabilized persistent radical of oxindole in the transformation, as well as the reaction underwent a radical-coupling pathway.

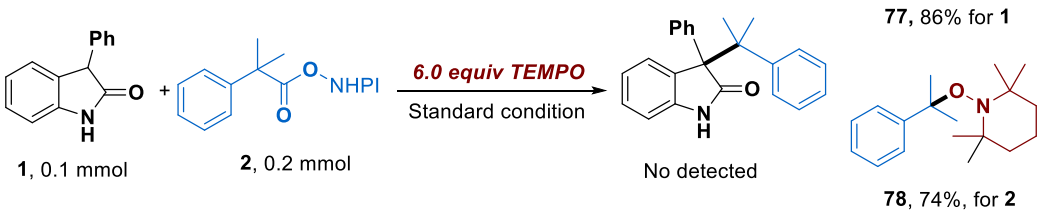



**Figure S6**. Radical Trapping Experiment.

### 6.5 Quantum Yield Determination

We tested the quantum yield of the reaction according to the procedure previous reported by Paolo Melchiorre[2].

A ferrioxalate actinometer solution was prepared by following the Hammond variation of the Hatchard and Parker procedure outlined in the Handbook of Photochemistry.

1. Potassium ferrioxalate solution: 294.8 mg of potassium ferrioxalate and 139 μL of sulfuric acid (96%) were added to a 50 mL volumetric flask, and filled to the mark with water.
2. Buffer solution with Phenanthroline: 100 mg 1,10-phenanthroline, 9.88 g of NaOAc and 2.0 mL of sulfuric acid (96%) were added to a 250 mL volumetric flask, and filled to the mark with water.

Both solutions were stored in the dark.

To determine the photon flux of the LEDs, the ferrioxalate solution (1.0 mL) was placed in a 10-mL Schlenk tube and irradiated for 10 s at 1 W LEDs ($\lambda_{max}$ = 395 nm, because of the high photo flux 10 W LEDs, this test uses 1 W LEDs as light source). After irradiation, the buffer solution with Phenanthroline (2.5 mL) was added to the cuvette and the mixture and stired in the dark for 1 h to allow the ferrous ions to completely coordinate to the phenanthroline. The absorbance of the solution was measured at 510 nm. A nonirradiated sample was also prepared and the absorbance at 510 nm was measured. Conversion was calculated using eq. 1.

$$\text{mol } Fe^{2+} = \frac{V \cdot \Delta A}{l \cdot \varepsilon} \quad (1)$$

where V is the total volume (0.0035 L) of the solution after addition of phenanthroline, ΔA is the difference in absorbance at 510 nm between the irradiated and non-irradiated solutions (because of the absorbancy of the ferrioxalate actinometer > 3.0, the solvent was diluted to one-tenth for

testing, $\Delta A = 0.313$), l is the path length (1.00 cm), and ε is the molar absorptivity of the ferrioxalate actinometer at 510 nm (11,100 L $mol^{-1}$ $cm^{-1}$). The mol $Fe^{2+}$ is $9.87\times10^{-7}$ mol.

$$\text{photo flux} = \frac{\text{mol } Fe^{2+}}{\Phi \cdot t \cdot f} \quad (2)$$

where Φ is the quantum yield for the ferrioxalate actinometer (1.13 at λex = 395 nm), t is the irradiation time (10 s), and f is the fraction of light absorbed at λex = 395nm by the ferrioxalate actinometer. This value is calculated using the following equation where A (395 nm) is the absorption of the ferrioxalate solution at 395 nm. An absorption spectrum gave an A (395 nm) value of > 3, indicating that the fraction of absorbed light (f) is > 0.999.

$$f = 1 - 10^{-A(395nm)} \quad (3)$$

The average photon flux was thus calculated to be $8.73\times10^{-8}$ einsteins $s^{-1}$.

Determination of the reaction quantum yield:

To an oven-dried 10-mL Schlenk tube equipped with a stirrer bar were added 3-substituted oxindole **1** (0.1 mmol, 20.9 mg) and redox-active ester **2** (0.2 mmol, 2.0 equiv). In glove box, the corresponding catalyst (catalyst was formulated as 0.02 mol/L in certain solvent) and freshly distilled THF were added. Continuous circulating water was introduced to ensure that the reaction is carried out at room temperature. The reaction mixture was irradiated using 1 W LEDs ($\lambda_{max}$ = 395 nm) for 24 hours. The isolate yield was 16%. The reaction quantum yield (Φ) was determined using eq. 4 where the photon flux is $8.73\times10^{-8}$ einsteins $s^{-1}$ (determined by actinometry as described above), t is the reaction time (24×60×60 s) and $f_R$ is the fraction of incident light absorbed by the reaction mixture, determined using eq 4. An absorption spectrum of the reaction mixture gave an absorbance value of > 3 at 395 nm (A > 3 indicating that the fraction of light absorbed is >0.999).

$$\Phi = \frac{\text{Mol product}}{\text{flux} \cdot t \cdot f} \quad (4)$$

The reaction quantum yield (Φ) was thus determined to be Φ = 0.0021.

## 6.6 Control Experiment for Radical-Radical Coupling Pathway

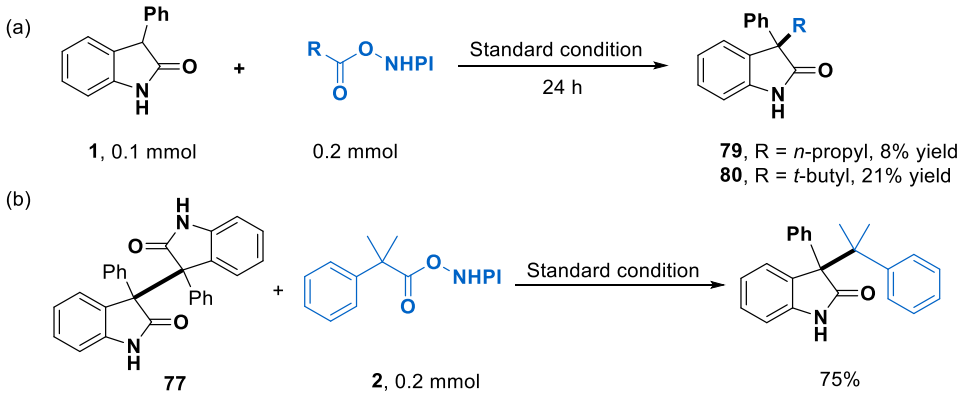



**Figure S7.** Control experiments

As shown in **Fig. S7a**, when the alkyl radical precursor was introduced into the reaction, low yield was obtained for the cross-coupling product under the standard condition. These results indicated that the benzyl radical rather than common alkyl radical prefer to react with the oxindole radical. Moreover, the dimerization product **77** can easily transform to the final product under the standard condition (**Fig. S7b**).

## 6.7 Control Experiment and Proposed $SN_2$ Addition Pathway

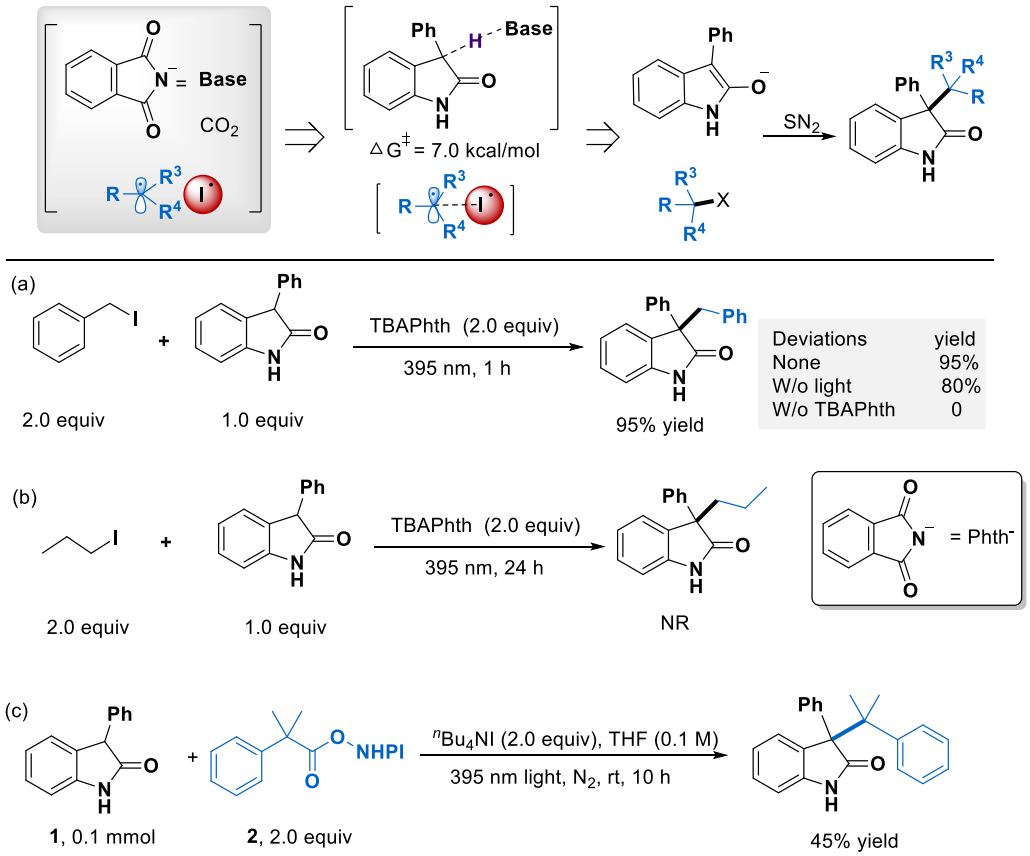



**Figure S8**. Proposed mechanism for $SN_2$ addition pathway

As shown in **Fig. S8**, the carbon radical R$^{\bullet}$ and halogen radical I$^{\bullet}$ with a base (Phth$^{-}$) would be generated by the SET process, and the alkyl halide can be formed by the followed recombination of carbon radical R$^{\bullet}$ and halogen radical I$^{\bullet}$. Meanwhile, the base (Phth$^{-}$) abstracted the hydrogen atom from oxindole, generating the enolate ion. Similar to radical coupling pathway, the control experiment indicated that under alkaline condition, the same product was obtained in high yield via $SN_2$ addition pathway, when the benzyl iodine was used as a starting material (**Fig. S8a**). When the alkyl iodine was introduced into the reaction, low yield was obtained under the same condition (**Fig. S8b**). If $SN_2$ addition was main pathway for the transformation, the reaction should be favored by increasing the catalyst loading. However, lower yield (45%) was obtained, when 2.0 equiv. $^{n}Bu_4NI$ was used (**Fig. S8c**). Based on these observed, we considered that, compare to the $SN_2$ addition pathway, the radical-radical coupling pathway was primary pathway in this transformation.

### 6.8 I• Act as Hydrogen-atom-transfer (HAT) Agent Pathway

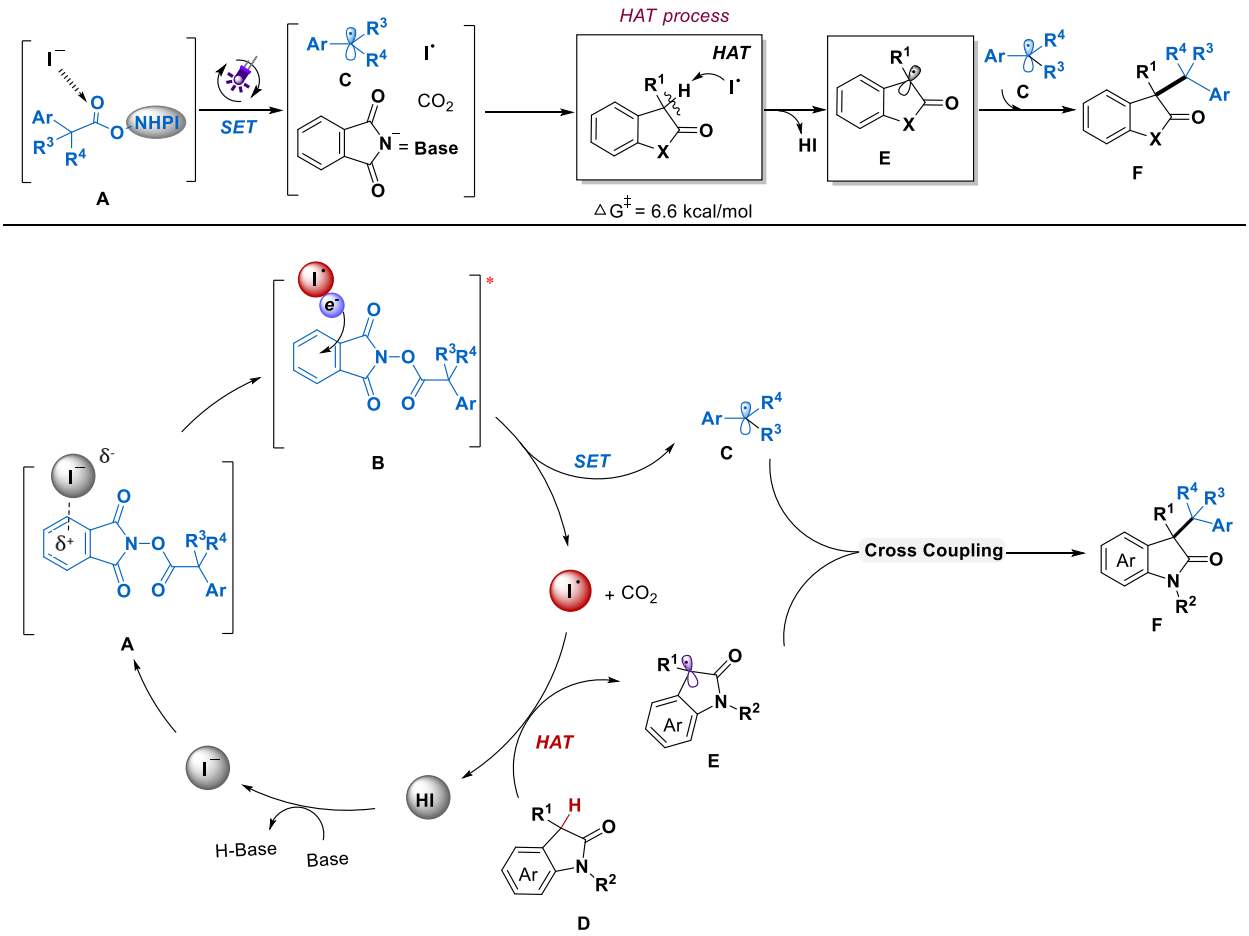



**Figure S9.** I• act as hydrogen-atom-transfer (HAT) agent pathway

As an alternative mechanism, the resulting I• act as hydrogen-atom-transfer (HAT) agent pathway is depicted in **Figure S9**. Upon visible light irradiation, the halide charge transfer complex **A** of halide ion $I^-$ and redox-active ester is excited under visible-light and generates the excited states $[I^{\bullet}+e^-]^*$, which, as a strong reducing reagent, transfers an electron to the redox-active ester, leading to the corresponding radical **C** along with the halogen radical I•. The resulting radical I• acts as a HAT reagent, abstracting the hydrogen atom from oxindole **D** to generate another radical **E** and regenerate the $I^-$ in the presence of the base (produced from the SET step). The combination of the oxindole radical **E** with the benzyl radical **C** affords the cross-coupling product **F**.

## 7 Cyclic Voltammetry Studies

### General Experimental Details

Cyclic voltammetry was performed in a three-electrode cell connected to a schlenk line at room temperature. The working electrode was a platinum disk electrode, the counter electrode a platinum wire. The reference was an Ag/AgCl electrode submerged in saturated aqueous KCl solution, and separated from reaction by a salt bridge. 5 mL of MeCN containing 0.1 M $LiClO_4$ were poured into the electrochemical cell in all experiments. Concentration of a sample: 0.05 M. The scan rate is 0.1 V/s, ranging from -2.0 V to 2.0 V. The peak potentials vs. Ag/AgCl for used.

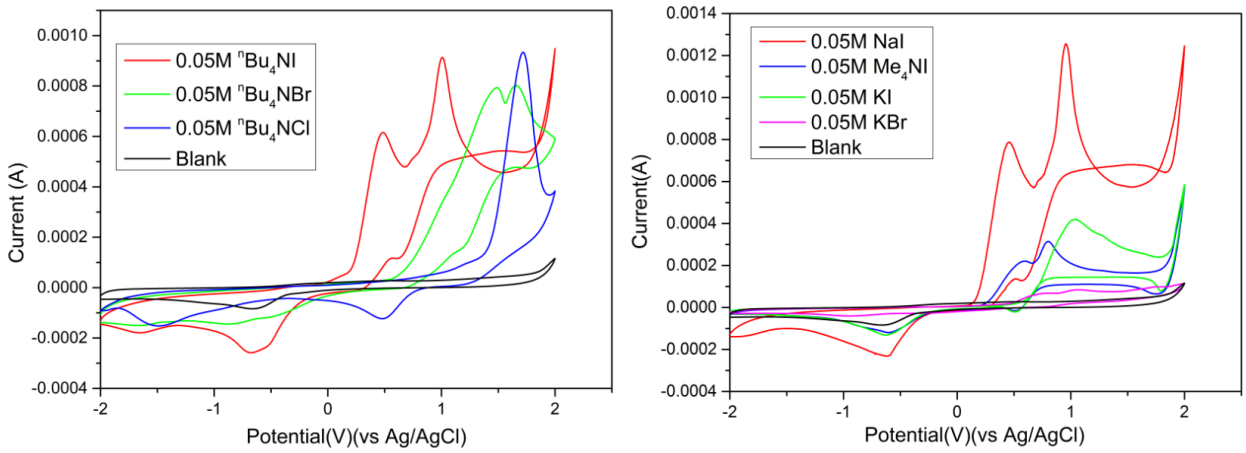



**Figure S10.**

## 8 Procedure for Sunlight-Induced and Gram-Scale Radical-Radical Coupling

### 8.1 Sunlight-Induced Radical-Radical Coupling

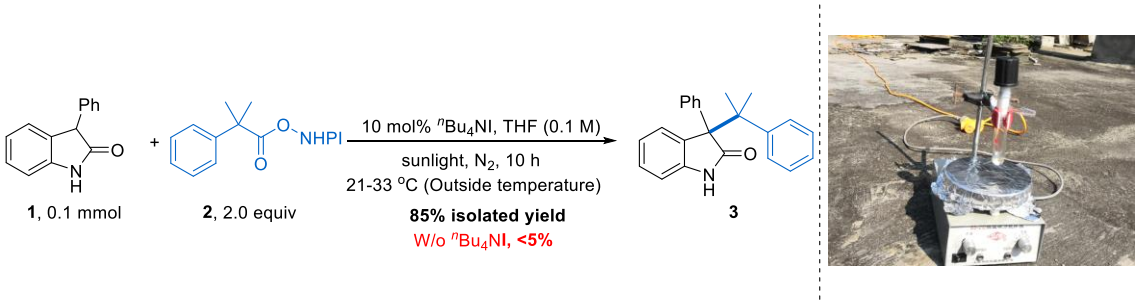



**Figure S11a.** Sunlight-induced radical-radical coupling

### 8.2 Gram-Scale Radical-Radical Coupling via Continuous-Flow System

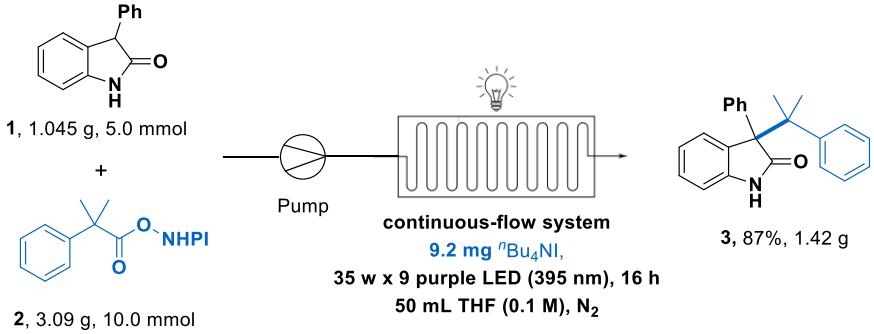
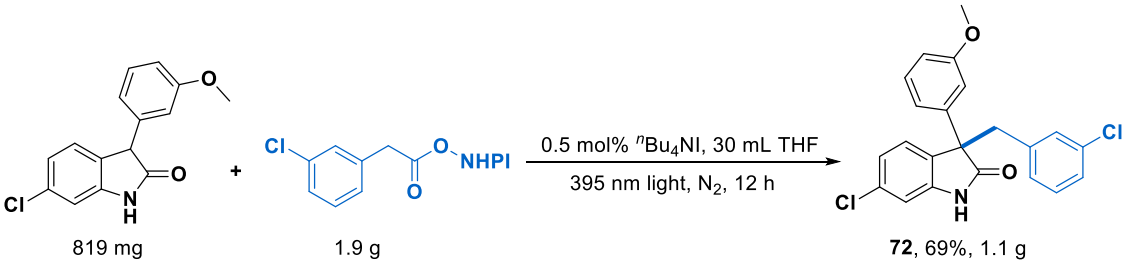



**Figure S11b.** Gram-Scale via Continuous-Flow System

To an oven-dried round bottom flask (100 mL) was charged with newly distilled 50 mL THF, 5.0 mmol **1** (1.045 g), 10.0 mmol **2** (3.09 g, 2.0 equiv), $^{n}Bu_4NI$ (9.2 mg, 0.5 mol%), nitrogen protected. All the steps are operated in the glove box. The area of light exposure is about 30 cm × 30 cm, the power of the light source is 35 W × 9. The reaction temperature was controled at 35 – 40 °C. The reaction was paepared with 50 mL syringe and injection pump for 16 h. After the reaction completed, the organic solvent was evaporated under reduced pressure. The crude product was dissolved in EtOAc (100 mL), washed with 10% $K_2CO_3$ (3 × 50 mL), dried over anhydrous sodium sulfate. The organic solvent was evaporated under reduced pressure. The crude product was purified by column chromatography (87% yield).

### 8.3 Gram-Scale Radical-Radical Coupling via Batch Reaction System




819 mg 1.9 g **72**, 69%, 1.1 g

To an oven-dried conical flask (1000 mL) was charged with super-dry 30 mL THF, 3.0 mmol 6-chloro-3-(3-methoxyphenyl)indolin-2-one (819 mg), 6.0 mmol 1,3-dioxoisoindolin-2-yl 2-(3-chlorophenyl)acetate (1.9 g, 2.0 equiv), TBAI (5.5 mg, 0.5 mol%), nitrogen protected. The area of light exposure is about 10 cm × 10 cm, the power of the light source is 6 W × 9. The reaction was controled in 35 – 40 °C for 12 h. After the reaction completed, the organic solvent was evaporated under reduced pressure. The crude product was dissolved in EtOAc (50 mL), washed with 10% $K_2CO_3$ (3 × 30 mL), dried over anhydrous sodium sulfate. The organic solvent was evaporated under reduced pressure. The crude product was purified by column chromatography (69% yield, 1.1 g).

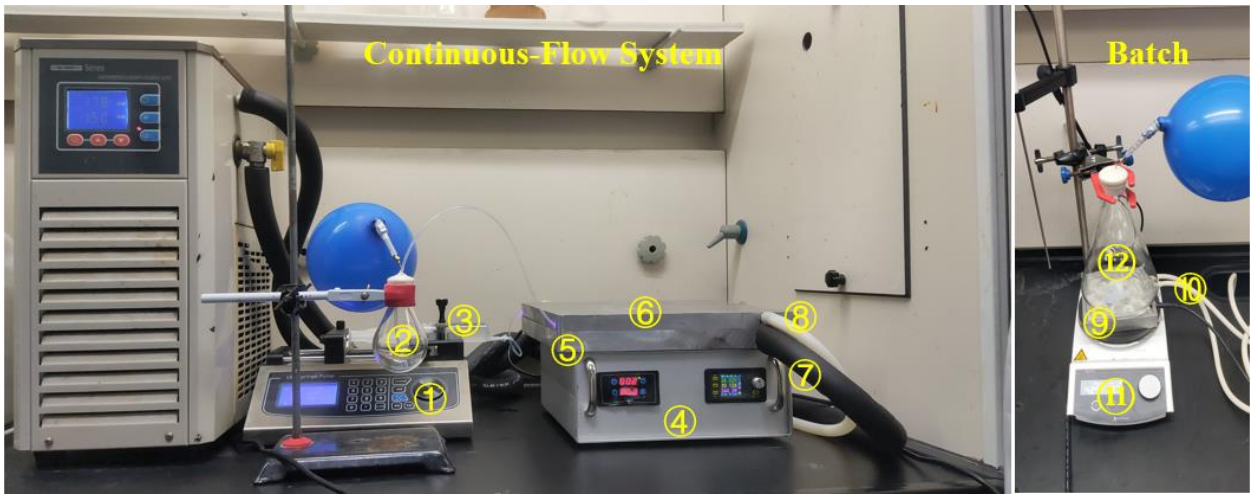



**Figure S12.** 1. Pump; 2. Reaction fluid receiver; 3. Injector; 4. Power; 5. LED lamp (35 W x 9); 6, Fluid pipe; 7, 15 °C ethanol coolant; 8. 25 °C water coolant; 9. LED lamp (6 W x 9); 10. 25 °C water coolant; 11. Stirrer; 12. Reaction bulb.

## 9 General Application of the method

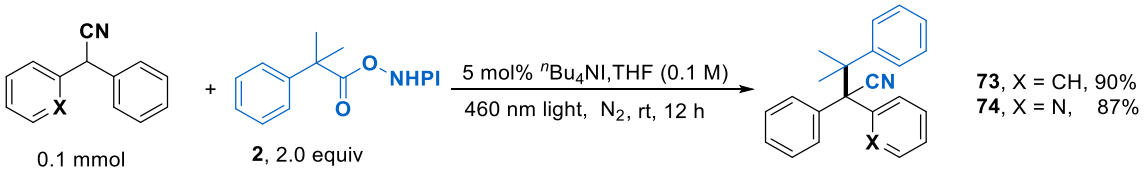
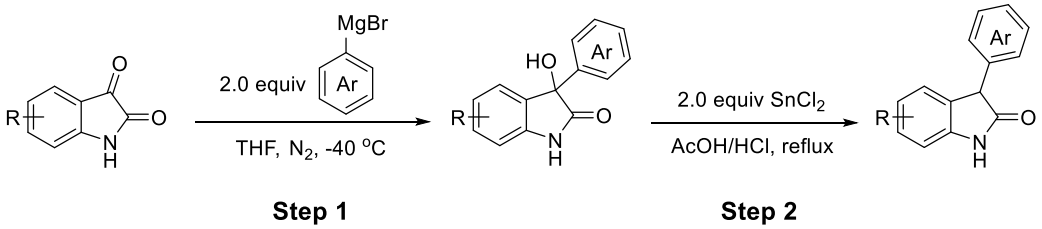



**Figure S13.** General application of the method.

## 10 Preparation for Substrates

### 10.1 Synthesis of 3-Arylindolin-2-one Derivatives




**Preparation for Aryl Grignard reagent**

To a stirring mixture of magnesium (1.2 equiv) and a small piece of iodine in dry THF (1 M). A solution of aryl bromide (1.0 equiv) in 2 mL of dry THF was added dropwise to the round bottom flask and stirred the reaction for 3 hours under $N_2$ atmosphere. After the formation of Grignard reagent (colorless to brownish-green). the reaction mixture was cooled to 0 °C.

**General Procedure for Step 1**

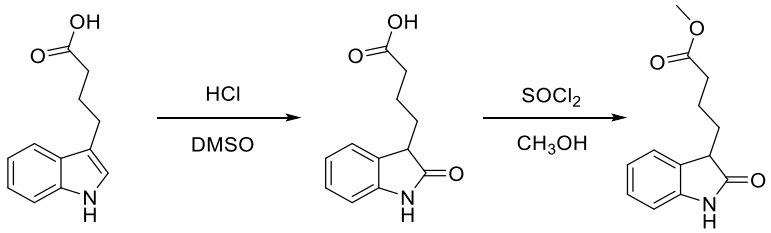
According to the reported literature[3], previously obtained Grignard reagent in THF (2.0 equiv) was added dropwise to a stirred cold (-40 °C) suspension of corresponding isatin (1.0 equiv) in dried THF (30 mL) under $N_2$ atmosphere. And then the mixture was allowed to warm to room temperature and was stirred until isatin was consumed completely. The reaction mixture was diluted with ether, cooled in an ice-bath, and then quenched with 1 N HCl. The aqueous layer was extracted with ether and the combined organic layers were washed with water and brine and then dried over $Na_2SO_4$. After the removal of solvent, 3-hydroxy-3-arylindolin-2-one as solid was obtained and no purification was necessary for further transformation.

**General Procedure for Step 2**

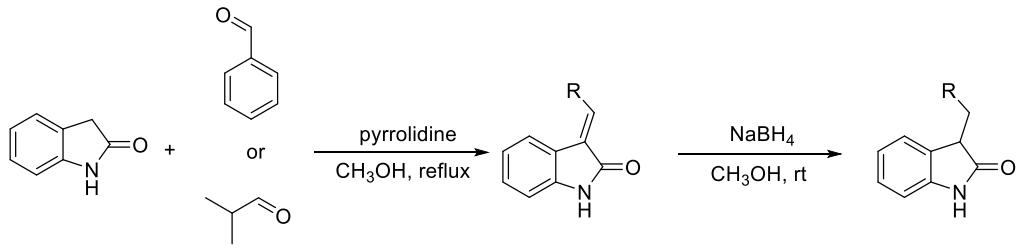
To a solution of the crude product (5.0 mmol) obtained above in AcOH/HCl (30 mL/2 ml), $SnCl_2$ (10.0 mmol) was added at room temperature. Then the mixture was heated to reflux for 4 h at which point tlc analysis indicated consumption of the starting material. Next, the solution was cooled to room temperature, concentrated *in vacuo*, and then diluted with EtOAc (75 ml). The solution was washed with water (3 × 20 ml), saturated aqueous $NaHCO_3$ (30 ml), and brine (30 ml). The organic layer was dried with anhydrous $Na_2SO_4$, filtered, and concentrated *in vacuo*. The

residue was recrystallized in petroleum ether and ethyl acetate to give corresponding product as white solid[4].

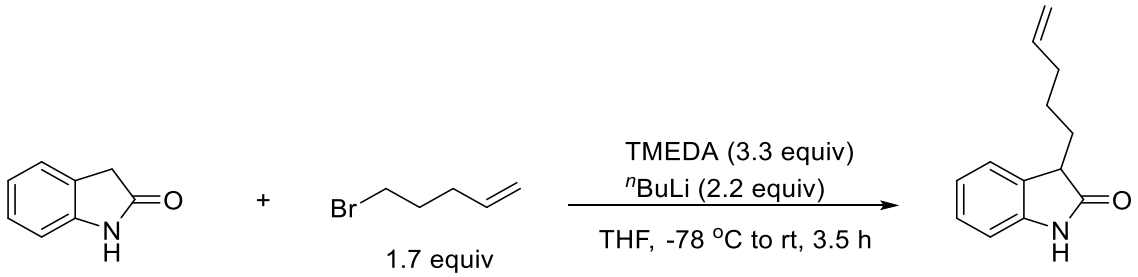
**10.2 Synthesis of 3-Alkylindolin-2-one Derivatives**




4-(2-oxoindolin-3-yl)butanoate was synthesized 2.0 g *1H*-indole-*3*-butanoic acid was dissolved in 7 mL DMSO, 16.6 mL concentrated HCl was dropwise to above solution over 5 min at room temperature. After 15 min this reaction was quenched with 50 mL water and extracted with EtOAc for 3 times. The combined extracts were washed with water, dried with $Na_2SO_4$ to give crude 4-(2-oxoindolin-3-yl)butanoic acid (73%) after removing solvents[5]. And then, the resulting 4-(2-oxoindolin-3-yl)butanoic acid dissolved in dried ice cooled $CH_3OH$ (10 mL) was treated dropwise with $SOCl_2$, and the mixture was stirred at room temperature until completely conversion. residue obtain through evaporating solvents was chromatographed on silica gel to give methyl 4-(2-oxoindolin-3-yl)butanoate as light yellow oily liquid in 96% yield.

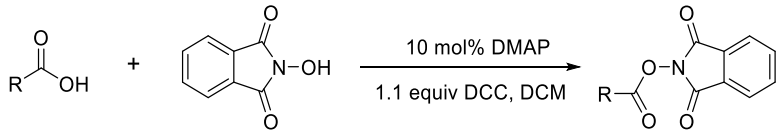



According to the reported literature[6, 7], To a solution of *2*-oxindole (532 mg, 4 mmol) in $CH_3OH$ was added aldehyde (4.4 mmol) and catalytic amount of pyrrolidine (40 μL). The mixture was heated to reflux for 6 hours and cooled to room temperature. To this yellow solution was added sodium hydroborate (760 mg, 20 mmol) portionably until the color faded and disappeared. The reaction was quenched by water and extracted with ethyl acetate. The organic layer was dried over anhydrous sodium sulfate, evaporated to give a residue which was purified by column chromatography on silica gel (PE : EA = 3 : 1) to afford products as white solid.




Alkylation of oxindoles was performed according to a previously reported procedure[8]. To a solution of oxindole (3 mmol, 400 mg) in a freshly distilled THF (20 mL) was added TMEDA (9.9 mmol), and the resulting solution was cooled to -78 °C. $^{n}$BuLi (6.6 mmol, 1.6 M in hexane) was added dropwise (5 minutes) and the resulting solution was stirred for 30 minutes. 5-bromopent-1-ene (5.1 mmol) was then added dropwise and the mixture was slowly warmed up to -20 °C and stirred for additional 3h at -20 °C. The reaction was quenched with aq. $NH_4Cl$ (20 mL) and extracted with EtOAc (3×25 mL). The combined organic layers were washed with brine, dried over $MgSO_4$, and evaporated under vacuum. Purification through silica gel (EtOAc : PE = 1 : 3) gave desired *3*-substituted oxindole.

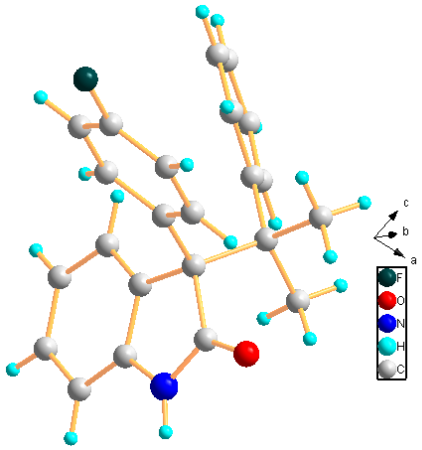
**10.3 Synthesis of Redox Active Esters**




According to the known literature with slight modification[9], A round-bottom flask was charged with carboxylic acid (4.0 mmol), *N*-hydroxyphthalimide (1.1 equiv), 4-dimethylaminopyridine (DMAP, 10 mol%), Dichloromethane (DCM) was added (15 mL), and the mixture was stirred vigorously. And then the solution of DCC (4.4 mmol in 6 mL DCM) was added dropwise via syringe at room temperature. After completed, the white precipitate was filtered off and the solution was concentrated *in vacuo*. Corresponding redox active esters were purified rapidly by column chromatography on silica gel.

## 11 X-Ray Crystallographic Data

### Compound 4




***A. Crystal Data***

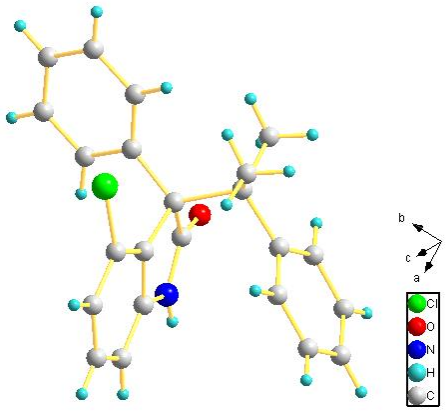
| | |
|---|---|
| formula | $C_{23}H_{20}FNO$ |
| formula weight | 345.40 |
| crystal dimensions (mm) | 0.34 ´ 0.16 ´ 0.12 |
| crystal system | triclinic |
| space group | $P\bar{1}$ (No. 2)] |
| unit cell parameters[a] | |
| *a* (Å) | 7.2842(2) |
| *b* (Å) | 10.4854(3) |
| *c* (Å) | 13.91094(4) |
| *a* (deg) | 66.451(10) |
| *b* (deg) | 79.503(10) |
| *g* (deg) | 72.798(10) |
| *V* (Å$^3$) | 874.47(4) |
| *Z* | 2 |
| $r_{calcd}$ (g cm$^{-3}$) | 1.312 |
| $\mu$ (mm$^{-1}$) | 0.087 |

*B. Data Collection and Refinement Conditions*

| | |
|---|---|
| diffractometer | Bruker D8 Photon II[b] |
| radiation (*l* [Å]) | Mo K*a* (0.71073) (microfocus source) |
| temperature (°C) | 170(2)K |
| data collection 2*q* limit (deg) | 52.88 |
| total data collected | 21700 ($-9 \le h \le 9$, $-13 \le k \le 13$, $-16 \le l \le 16$) |
| independent reflections | 3545 ($R_{int}$ = 0.0298) |
| number of observed reflections (*NO*) | 3092 [$F_o^2 \ge 2s(F_o^2)$] |
| structure solution method | intrinsic phasing (*SHELXT-2014*[c]) |
| refinement method | full-matrix least-squares on $F^2$ (*SHELXL–2018*[d]) |

| | |
|---|---|
| absorption correction method | Gaussian integration (face-indexed) |
| range of transmission factors | 1.0000–0.9657 |
| data/restraints/parameters | 3545 / 0 / 241 |
| goodness-of-fit ($S$)[e] [all data] | 1.040 |
| final $R$ indices[f] | |
| $R_1$ [$F_o^2 \geq 2s(F_o^2)$] | 0.0539 |
| $wR_2$ [all data] | 0.0912 |
| largest difference peak and hole | 0.278 and –0.157 e Å$^{-3}$ |

**Compound 17**




***A. Crystal Data***

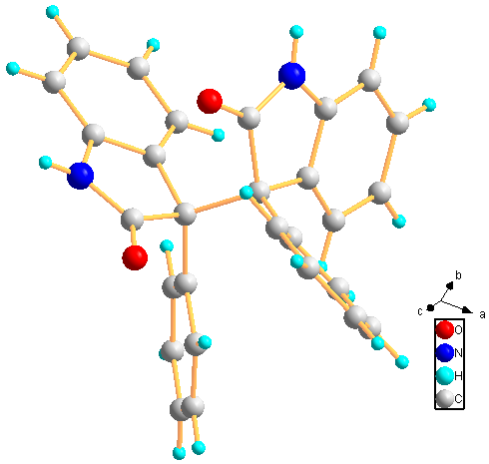
| | |
|---|---|
| formula | $C_{23}H_{20}ClNO$ |
| formula weight | 361.12 |
| crystal dimensions (mm) | 0.24 ´ 0.20 ´ 0.18 |
| crystal system | triclinic |
| space group | $P\bar{1}$ (No. 2)] |
| unit cell parameters[a] | |
| $a$ (Å) | 10.4147(4) |
| $b$ (Å) | 10.9205(3) |
| $c$ (Å) | 10.9542(4) |
| $a$ (deg) | 84.656(2) |
| $b$ (deg) | 63.300(2) |
| $g$ (deg) | 85.811(2) |
| $V$ (Å$^3$) | 1107.50(7) |
| $Z$ | 2 |
| $r_{calcd}$ (g cm$^{-3}$) | 1.340 |
| $\mu$ (mm$^{-1}$) | 0.429 |

*B. Data Collection and Refinement Conditions*

| | |
|---|---|
| diffractometer | Bruker D8 Photon II[b] |
| radiation ($l$ [Å]) | Mo K$a$ (0.71073) (microfocus source) |

| | |
|---|---|
| temperature (°C) | 170(2)K |
| data collection 2*q* limit (deg) | 52.88 |
| total data collected | 23390 (-13 ≤ *h* ≤ 12, -13 ≤ *k* ≤ 13, -13 ≤ *l* ≤ 13) |
| independent reflections | 4421 ($R_{int}$ = 0.0820) |
| number of observed reflections (*NO*) | 3396 [$F_o^2 \geq 2s(F_o^2)$] |
| structure solution method | intrinsic phasing (*SHELXT-2014*[c]) |
| refinement method | full-matrix least-squares on $F^2$ (*SHELXL–2018*[d]) |
| absorption correction method | Gaussian integration (face-indexed) |
| range of transmission factors | 0.9917–0.9217 |
| data/restraints/parameters | 4421 / 0 / 268 |
| goodness-of-fit (*S*)[e] [all data] | 1.231 |
| final *R* indices[f] | |
| $R_1$ [$F_o^2 \geq 2s(F_o^2)$] | 0.0812 |
| $wR_2$ [all data] | 0.1183 |
| largest difference peak and hole | 0.290 and –0.344 e Å$^{-3}$ |

**Compound 77**




***A. Crystal Data***

| | |
|---|---|
| formula | $C_{28}H_{20}N_2O_2$ |
| formula weight | 416.46 |
| crystal dimensions (mm) | 0.40 ´ 0.18 ´ 0.15 |
| crystal system | triclinic |
| space group | $P\bar{1}$ (No. 2)] |
| unit cell parameters[a] | |
| *a* (Å) | 13.6623(11) |
| *b* (Å) | 14.2739(11) |
| *c* (Å) | 14.3372(11) |
| *a* (deg) | 65.079(3) |
| *b* (deg) | 84.543(4) |
| *g* (deg) | 65.892(4) |

| | |
|---|---|
| $V$ (Å$^3$) | 2304.40(3) |
| $Z$ | 4 |
| $r_{calcd}$ (g cm$^{-3}$) | 1.200 |
| $\mu$ (mm$^{-1}$) | 0.076 |

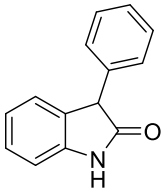
*B. Data Collection and Refinement Conditions*

| | |
|---|---|
| diffractometer | Bruker D8 Photon II[b] |
| radiation ($l$ [Å]) | Mo K$a$ (0.71073) (microfocus source) |
| temperature (°C) | 170(2)K |
| data collection 2$q$ limit (deg) | 55.27 |
| total data collected | 10388 (-17 ≤ $h$ ≤ 17, -16 ≤ $k$ ≤ 18, -18 ≤ $l$ ≤ 18) |
| independent reflections | 10388 ($R_{int}$ = ?) |
| number of observed reflections ($NO$) | 7890 [$F_o^2 \geq 2s(F_o^2)$] |
| structure solution method | intrinsic phasing (*SHELXT-2014*[c]) |
| refinement method | full-matrix least-squares on $F^2$ (*SHELXL–2018*[d]) |
| absorption correction method | Gaussian integration (face-indexed) |
| range of transmission factors | 1.000–0.8135 |
| data/restraints/parameters | 10388 / 5 / 595 |
| goodness-of-fit ($S$)[e] [all data] | 1.140 |
| final $R$ indices[f] | |
| $R_1$ [$F_o^2 \geq 2s(F_o^2)$] | 0.1377 |
| $wR_2$ [all data] | 0.4034 |
| largest difference peak and hole | 1.184 and –0.960 e Å$^{-3}$ |

## 12 Characterization Data

**Note**：When we tested the melting point of products, it was found that all compounds decompose before melting (190-210 ℃), so we did not mark the melting point of these compounds. The unknown impurity (around 1.56 ppm and 2.9 ppm) in NMR is from the eluent (PE), which do not affect the yield of the product (background correction of yield was done for each compounds).

### 3-phenylindolin-2-one. (1)



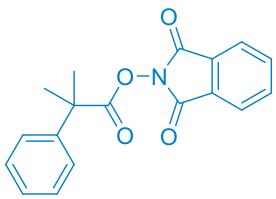
Isolated yield 76% (794 mg, 5 mmol scale), white solid, eluent (PE : EA = 3 : 1).

**$^{1}$H NMR** (400 MHz, DMSO) δ 10.54 (s, 1H), 7.38 – 7.31 (m, 2H), 7.31 – 7.26 (m, 1H), 7.23 (dd, *J* = 11.0, 4.3 Hz, 1H), 7.15 (dd, *J* = 5.2, 3.2 Hz, 2H), 7.04 (d, *J* = 7.3 Hz, 1H), 6.98 – 6.90 (m, 2H), 4.76 (s, 1H).

**$^{13}$C NMR** (101 MHz, DMSO) δ 177.62, 143.22, 138.17, 130.51, 129.14, 128.82, 128.57, 127.54, 125.23, 122.12, 109.93, 52.23.

**HRMS** (ESI) calcd for $C_{14}H_{11}NO$ $(M+Na)^+$ 232.0733, found 232.0727.

### 1,3-dioxoisoindolin-2-yl 2-methyl-2-phenylpropanoate. (2)



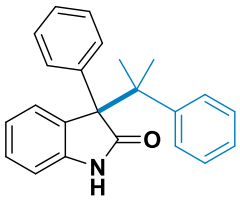
Isolated yield 84% (1297 mg, 5 mmol scale), white solid, eluent (PE : EA = 15 : 1) .The compound data was in agreement with the literature (Ref. *Org. Lett.* 2018, **20**, 4824).

**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 7.89 – 7.83 (m, 2H), 7.80 – 7.74 (m, 2H), 7.53 – 7.48 (m, 2H), 7.45 – 7.40 (m, 2H), 7.35 – 7.29 (m, 1H), 1.79 (s, 6H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 173.27, 161.99, 142.60, 134.74, 129.01, 128.71, 127.46, 125.81, 123.90, 46.36, 26.86.

**HRMS** (ESI) calcd for $C_{18}H_{15}NO_4$ $(M+Na)^+$ 332.0893, found 332.0885.

### 3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one. (3)



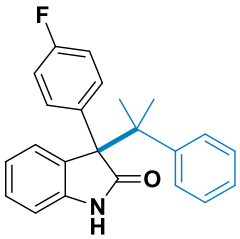
According to general procedure A, isolated yield 92% (30.1 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 8.46 (s, 1H), 7.88 – 7.81 (m, 2H), 7.32 – 7.27 (m, 3H), 7.21 – 7.14 (m, 2H), 7.10 (t, *J* = 7.4 Hz, 2H), 6.89 (td, *J* = 7.7, 1.0 Hz, 1H), 6.81 (t, *J* = 7.3 Hz, 3H), 6.55 (d, *J* = 7.7 Hz, 1H), 1.71 (s, 3H), 1.41 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.32, 144.46, 140.97, 135.39, 130.40, 130.22, 128.76, 128.54, 127.88, 127.29, 127.22, 126.86, 126.49, 120.82, 109.37, 62.42, 45.05, 25.58, 24.83.

**HRMS** (ESI) calcd for $C_{23}H_{21}NO$ $(M+Na)^+$ 350.1515, found 350.1513.

**3-(4-fluorophenyl)-3-(2-phenylpropan-2-yl)indolin-2-one. (4)**



According to general procedure A, isolated yield 81% (27.9 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

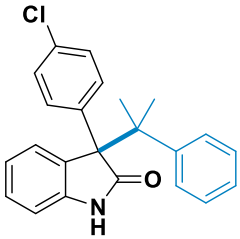
**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 8.51 (s, 1H), 7.81 (dd, *J* = 9.0, 5.4 Hz, 2H), 7.22 – 7.15 (m, 2H), 7.12 (t, *J* = 7.4 Hz, 2H), 6.97 (t, *J* = 8.7 Hz, 2H), 6.88 (t, *J* = 7.6 Hz, 1H), 6.82 (t, *J* = 7.5 Hz, 3H), 6.47 (d, *J* = 7.6 Hz, 1H), 1.68 (s, 3H), 1.39 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.23, 162.09 (d, *J* = 248.5 Hz), 144.20, 140.96, 131.96 (d, *J* = 8.1 Hz), 131.11 (d, *J* = 4.0 Hz), 130.25, 128.63, 128.51, 128.04, 126.93, 126.60, 120.95, 114.00 (d, *J* = 21.2 Hz), 109.45, 61.81, 45.03, 25.41, 24.74.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ -115.62.

**HRMS** (ESI) calcd for $C_{23}H_{20}FNO$ $(M+Na)^+$ 368.1421, found 368.1416.

**3-(4-chlorophenyl)-3-(2-phenylpropan-2-yl)indolin-2-one. (5)**



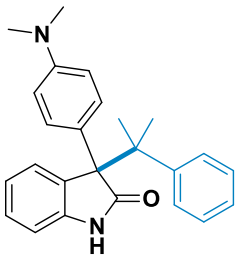
According to general procedure A, isolated yield 69% (24.9 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 8.06 (s, 1H), 7.69 (d, *J* = 8.8 Hz, 2H), 7.17 (d, *J* = 7.2 Hz, 3H), 7.11 (t, *J* = 7.4 Hz, 2H), 7.05 (t, *J* = 7.4 Hz, 2H), 6.80 (t, *J* = 7.6 Hz, 1H), 6.73 (t, *J* = 8.1 Hz, 3H), 6.39 (d, *J* = 7.5 Hz, 1H), 1.59 (s, 3H), 1.31 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 178.71, 144.09, 140.81, 133.99, 133.42, 131.62, 129.96, 128.65, 128.49, 128.11, 127.36, 126.97, 126.65, 121.01, 109.38, 61.86, 45.07, 25.37, 24.73.

**HRMS** (ESI) calcd for $C_{23}H_{20}ClNO$ $(M+Na)^+$ 384.1126, found 384.1127.

**3-(4-(dimethylamino)phenyl)-3-(2-phenylpropan-2-yl)indolin-2-one. (6)**



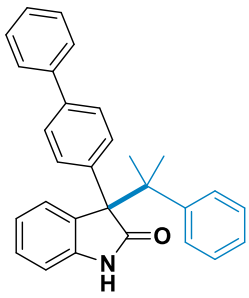
According to general procedure A, isolated yield 73% (23.3 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 3 : 1 : 4).

**$^1$H NMR** (400 MHz, DMSO) δ 10.34 (s, 1H), 7.55 (d, *J* = 9.0 Hz, 2H), 7.21 – 7.02 (m, 4H), 6.84 – 6.76 (m, 3H), 6.72 – 6.54 (m, 4H), 2.87 (s, 6H), 1.57 (s, 3H), 1.31 (s, 3H).

**$^{13}$C NMR** (101 MHz, DMSO) δ 178.81, 149.53, 145.29, 142.37, 131.13, 130.92, 128.34, 128.29, 127.99, 127.20, 126.59, 122.99, 120.34, 111.40, 109.41, 61.16, 44.52, 40.38, 26.04, 25.03.

**HRMS** (ESI) calcd for $C_{25}H_{26}N_2O$ $(M+H)^+$ 371.2118, found 371.2116.

**3-([1,1'-biphenyl]-4-yl)-3-(2-phenylpropan-2-yl)indolin-2-one. (7)**



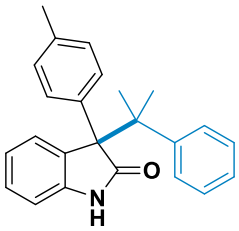
According to general procedure A, isolated yield 78% (31.5 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.02 (s, 1H), 7.91 (d, *J* = 8.6 Hz, 2H), 7.65 – 7.59 (m, 2H), 7.54 (d, *J* = 8.6 Hz, 2H), 7.44 (t, *J* = 7.6 Hz, 2H), 7.35 (t, *J* = 7.3 Hz, 1H), 7.19 (t, *J* = 7.5 Hz, 2H), 7.13 (t, *J* = 7.4 Hz, 2H), 6.96 - 6.85 (m, 3H), 6.80 (d, *J* = 7.6 Hz, 1H), 6.59 (d, *J* = 7.4 Hz, 1H), 1.75 (s, 3H), 1.45 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 178.86, 144.46, 140.84, 140.51, 139.78, 134.52, 130.64, 130.37, 128.80, 128.77, 128.57, 127.93, 127.35, 127.02, 126.91, 126.53, 125.82, 120.90, 109.26, 62.21, 45.15, 25.57, 24.82.

**HRMS** (ESI) calcd for $C_{29}H_{25}NO$ $(M+Na)^+$ 426.1828, found 426.1829.

**3-(2-phenylpropan-2-yl)-3-(p-tolyl)indolin-2-one. (8)**



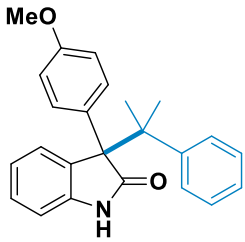
According to general procedure A, isolated yield 84% (28.6 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.26 (s, 1H), 7.71 (d, *J* = 8.3 Hz, 2H), 7.21 – 7.06 (m, 6H), 6.97 - 6.77 (m, 3H), 6.78 (d, *J* = 7.7 Hz, 1H), 6.54 (d, *J* = 7.5 Hz, 1H), 2.34 (s, 3H), 1.70 (s, 3H), 1.41 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.27, 144.63, 140.91, 136.85, 132.36, 130.63, 130.11, 128.69, 128.56, 128.02, 127.76, 126.83, 126.41, 120.75, 109.21, 62.15, 44.92, 25.58, 24.82, 20.93.

**HRMS** (ESI) calcd for $C_{24}H_{23}NO$ $(M+Na)^+$ 364.1672, found 364.1668.

**3-(4-methoxyphenyl)-3-(2-phenylpropan-2-yl)indolin-2-one. (9)**



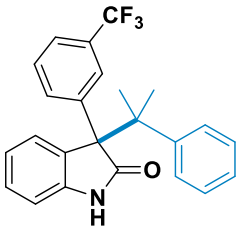
According to general procedure A, isolated yield 90% (32.1 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, DMSO) δ 10.43 (s, 1H), 7.69 (d, *J* = 9.0 Hz, 2H), 7.24 - 7.08 (m, 4H), 6.91 – 6.78 (m, 5H), 6.74 – 6.62 (m, 2H), 3.74 (s, 3H), 1.57 (s, 3H), 1.32 (s, 3H).

**$^{13}$C NMR** (101 MHz, DMSO) δ 178.58, 158.61, 144.94, 142.40, 131.40, 130.77, 128.37, 128.33, 128.23, 127.92, 127.25, 126.71, 120.53, 113.02, 109.56, 61.25, 55.47, 44.54, 25.91, 25.00.

**HRMS** (ESI) calcd for $C_{24}H_{23}NO_2$ $(M+Na)^+$ 380.1621, found 380.1612.

**3-(2-phenylpropan-2-yl)-3-(3-(trifluoromethyl)phenyl)indolin-2-one. (10)**



According to general procedure A, isolated yield 65% (25.7 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

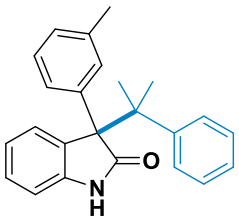
**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.54 (s, 1H), 8.14 – 8.02 (m, 2H), 7.56 (d, *J* = 7.6 Hz, 1H), 7.42 (t, *J* = 7.8 Hz, 1H), 7.22 (t, *J* = 7.7 Hz, 1H), 7.17 (d, *J* = 7.1 Hz, 1H), 7.11 (t, *J* = 7.4 Hz, 2H), 6.93 (t, *J* = 7.6 Hz, 1H), 6.84 (d, *J* = 7.7 Hz, 1H), 6.78 (d, *J* = 7.6 Hz, 2H), 6.54 (d, *J* = 7.6 Hz, 1H), 1.67 (s, 3H), 1.42 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 178.69, 143.71, 140.96, 136.61, 133.42, 129.59, 129.56 (d, *J* = 32.3 Hz), 128.58, 128.46, 128.32, 127.63, 127.09 (q, *J* = 4.0 Hz), 126.97, 126.80, 124.23 (d, *J* = 272.7 Hz), 124.02 (q, *J* = 3.7 Hz), 121.20, 109.58, 62.09, 45.24, 25.19, 24.72.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ -62.54.

**HRMS** (ESI) calcd for $C_{24}H_{20}F_3NO$ $(M+Na)^+$ 418.1389, found 418.1388.

**3-(2-phenylpropan-2-yl)-3-(m-tolyl)indolin-2-one. (11)**



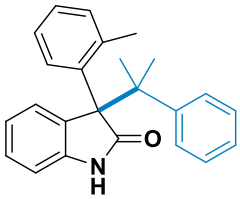
According to general procedure A, isolated yield 82% (28.0 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.45 (s, 1H), 7.67 (s, 1H), 7.60 (d, *J* = 8.0 Hz, 1H), 7.22 – 7.14 (m, 3H), 7.13 – 7.07 (m, 3H), 6.89 (td, *J* = 7.7, 1.0 Hz, 1H), 6.85 (d, *J* = 7.4 Hz, 2H), 6.80 (d, *J* = 7.7 Hz, 1H), 6.60 (d, *J* = 7.6 Hz, 1H), 2.34 (s, 3H), 1.70 (s, 3H), 1.42 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.29, 144.55, 140.99, 136.67, 135.32, 130.87, 130.62, 128.74, 128.61, 127.89, 127.80, 127.32, 127.12, 126.77, 126.46, 120.79, 109.28, 62.39, 44.98, 25.61, 24.87, 21.80.

**HRMS** (ESI) calcd for $C_{24}H_{23}NO$ $(M+H)^+$ 342.1852, found 342.1846.

**3-(2-phenylpropan-2-yl)-3-(o-tolyl)indolin-2-one. (12)**



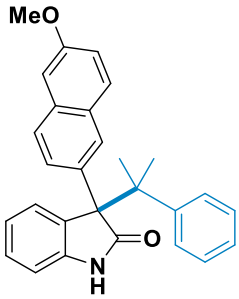
According to general procedure A, isolated yield 38% (13.0 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.25 – 8.10 (m, 2H), 7.25 – 7.09 (m, 4H), 7.05 (t, *J* = 7.4 Hz, 3H), 7.00 – 6.82 (m, 4H), 6.61 (d, *J* = 7.5 Hz, 1H), 1.96 (s, 3H), 1.91 (s, 3H), 1.81 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 181.10, 146.20, 141.94, 138.18, 138.08, 133.14, 131.77, 129.75, 128.49, 128.06, 126.89, 126.61, 126.22, 125.05, 121.53, 109.00, 63.89, 45.34, 21.37.

**HRMS** (ESI) calcd for $C_{24}H_{23}NO$ $(M+H)^+$ 342.1852, found 342.1843.

**3-(6-methoxynaphthalen-2-yl)-3-(2-phenylpropan-2-yl)indolin-2-one. (13)**



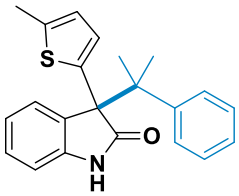

According to general procedure A, isolated yield 92% (37.4 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 8.53 (s, 1H), 8.15 (s, 1H), 8.05 – 7.99 (m, 1H), 7.68 (t, *J* = 8.5 Hz, 2H), 7.21 (t, *J* = 7.6 Hz, 1H), 7.20 – 7.04 (m, 5H), 6.94 (t, *J* = 7.6 Hz, 1H), 6.85 (dd, *J* = 7.6, 2.0 Hz, 3H), 6.66 (d, *J* = 7.5 Hz, 1H), 3.93 (s, 3H), 1.76 (s, 3H), 1.46 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.38, 157.99, 144.60, 141.06, 133.48, 130.62, 130.17, 129.61, 128.78, 128.60, 128.45, 128.07, 127.90, 126.86, 126.49, 125.34, 120.88, 118.66, 109.39, 105.07, 62.45, 55.32, 45.26, 25.71, 24.93.

**HRMS** (ESI) calcd for $C_{28}H_{25}NO_2$ $(M+Na)^+$ 430.1778, found 430.1772.

**3-(5-methylthiophen-2-yl)-3-(2-phenylpropan-2-yl)indolin-2-one. (14)**



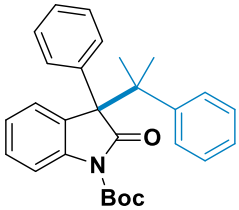

According to general procedure B (5 mol% $^{n}Bu_4NI$, 14 hours ), isolated yield 63% (21.8 mg, 0.1 mmol scale), white solid, eluent (PE : EA = 5 : 1).

**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 8.01 (s, 1H), 7.23 – 7.04 (m, 5H), 6.99 – 6.93 (m, 2H), 6.89 (td, *J* = 7.7, 1.0 Hz, 1H), 6.75 – 6.62 (m, 2H), 6.65 – 6.57 (m, 1H), 2.43 (d, *J* = 0.8 Hz, 3H), 1.76 (s, 3H), 1.47 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 178.40, 143.98, 140.62, 139.52, 136.49, 131.33, 128.57, 128.17, 128.15, 127.36, 126.91, 126.47, 124.36, 121.12, 109.20, 60.87, 44.96, 25.14, 24.16, 15.14.

**HRMS** (ESI) calcd for $C_{21}H_{21}NOS$ $(M+Na)^+$ 370.1236, found 370.1238.

**tert-butyl 2-oxo-3-phenyl-3-(2-phenylpropan-2-yl)indoline-1-carboxylate. (15)**



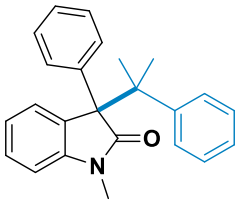

According to general procedure A, isolated yield 99% (42.2 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 10 : 1).

**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 7.84 – 7.78 (m, 2H), 7.70 (dd, *J* = 8.2, 0.6 Hz, 1H), 7.32 – 7.28 (m, 3H), 7.25 – 7.22 (m, 1H), 7.19 – 7.16 (m, 1H), 7.11 (t, *J* = 7.5 Hz, 2H), 6.98 (td, *J* = 7.7, 1.1 Hz, 1H), 6.78 – 6.73 (m, 2H), 6.50 (d, *J* = 7.6 Hz, 1H), 1.72 (s, 3H), 1.61 (s, 9H), 1.40 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 175.29, 149.00, 144.24, 139.78, 135.22, 130.14, 128.54, 128.36, 128.31, 128.07, 127.47, 127.43, 126.98, 126.63, 122.50, 114.22, 84.23, 61.86, 46.23, 28.12, 25.87, 24.84.

**HRMS** (ESI) calcd for $C_{28}H_{29}NO_3$ $(M+Na)^+$ 450.2040, found 450.2041.

**1-methyl-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one. (16)**



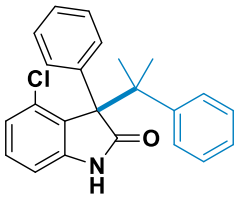

According to general procedure A, isolated yield 68% (23.2 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 10 : 1 : 6).

**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 7.95 – 7.87 (m, 2H), 7.32 – 7.27 (m, 3H), 7.22 (td, *J* = 7.7, 1.2 Hz, 1H), 7.19 – 7.14 (m, 1H), 7.12 – 7.06 (m, 2H), 6.92 (td, *J* = 7.6, 1.1 Hz, 1H), 6.84 – 6.77 (m, 2H), 6.74 – 6.64 (m, 2H), 3.05 (s, 3H), 1.70 (s, 3H), 1.38 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 176.86, 144.53, 143.78, 135.57, 130.23, 129.78, 128.33, 127.90, 127.29, 127.18, 126.76, 126.40, 120.88, 107.71, 61.97, 45.27, 25.98, 25.48, 24.62.

**HRMS** (ESI) calcd for $C_{24}H_{23}NO$ $(M+Na)^+$ 342.1852, found 342.1848.

**4-chloro-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one. (17)**



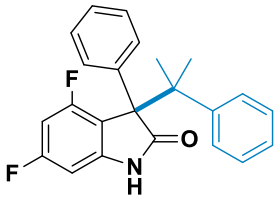

According to general procedure A, isolated yield 44% (15.9 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 8.10 (s, 1H), 7.57 (dd, *J* = 8.0, 1.6 Hz, 2H), 7.33 – 7.26 (m, 3H), 7.11 – 6.98 (m, 6H), 6.92 (dd, *J* = 8.1, 0.8 Hz, 1H), 6.49 (dd, *J* = 7.7, 0.8 Hz, 1H), 1.96 (d, *J* = 6.7 Hz, 6H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.94, 145.85, 143.05, 136.71, 132.69, 130.89, 130.14, 129.23, 127.77, 127.25, 127.13, 126.99, 126.42, 124.69, 108.00, 66.61, 46.70, 28.37, 25.11.

**HRMS** (ESI) calcd for $C_{23}H_{20}ClNO$ $(M+Na)^+$ 384.1126, found 384.1130.

**4,6-difluoro-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one. (18)**



According to general procedure A, isolated yield 83% (30.1 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

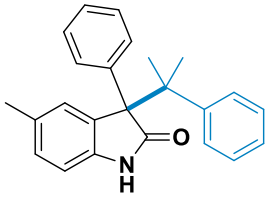
**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 8.31 (s, 1H), 7.92 – 7.84 (m, 2H), 7.38 – 7.29 (m, 3H), 7.20 – 7.13 (m, 2H), 7.07 – 7.02 (m, 3H), 6.53 – 6.41 (m, 1H), 6.23 (dd, *J* = 7.8, 2.0 Hz, 1H), 1.69 (s, 3H), 1.56 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 178.22, 164.41, 164.23, 164.11, 162.96, 161.78, 161.64, 160.09, 159.40, 157.77, 156.78, 144.95, 143.43, 143.30, 143.17, 135.33, 129.47, 129.42, 127.86, 127.61, 127.21, 126.94, 126.39, 113.75, 98.48, 98.22, 98.17, 97.91, 94.44, 94.41, 94.18, 94.15, 66.05, 66.02, 46.35, 26.34, 26.24, 25.25.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ -96.24, -96.26, -108.97, -109.00.

**HRMS** (ESI) calcd for $C_{23}H_{19}F_2NO$ $(M+Na)^+$ 386.1327, found 386.1318.

**5-methyl-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one. (19)**



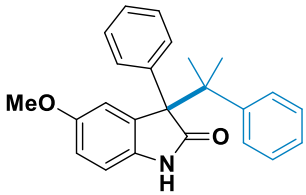
According to general procedure A, isolated yield 85% (29.0 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 8.12 (s, 1H), 7.83 (dd, *J* = 6.7, 2.8 Hz, 2H), 7.32 – 7.27 (m, 3H), 7.19 (t, *J* = 7.2 Hz, 1H), 7.12 (t, *J* = 7.5 Hz, 2H), 6.98 (d, *J* = 7.8 Hz, 1H), 6.81 (d, *J* = 7.6 Hz, 2H), 6.68 (d, *J* = 7.8 Hz, 1H), 6.22 (s, 1H), 2.22 (s, 3H), 1.71 (s, 3H), 1.39 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.08, 144.59, 138.45, 135.54, 130.30, 130.24, 129.90, 129.78, 128.64, 128.08, 127.23, 127.14, 126.73, 126.48, 108.79, 62.38, 45.04, 25.53, 24.85, 21.37.

**HRMS** (ESI) calcd for $C_{24}H_{23}NO$ $(M+Na)^+$ 364.1672, found 364.1674.

**5-methoxy-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one. (20)**



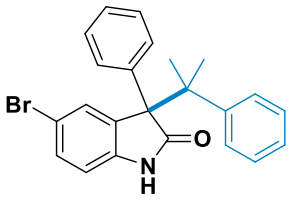
According to general procedure A, isolated yield 94% (33.6 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.57 (s, 1H), 7.84 (dd, *J* = 6.0, 3.5 Hz, 2H), 7.34 – 7.27 (m, 3H), 7.21 – 7.10 (m, 3H), 6.83 (d, *J* = 7.4 Hz, 2H), 6.74 (s, 2H), 6.04 (s, 1H), 3.64 (s, 3H), 1.73 (s, 3H), 1.40 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.40, 154.09, 144.53, 135.41, 134.63, 131.52, 130.19, 128.64, 127.29, 127.24, 126.92, 126.57, 115.91, 113.07, 109.44, 62.81, 55.69, 45.04, 25.69, 24.85.

**HRMS** (ESI) calcd for $C_{24}H_{23}NO_2$ $(M+Na)^+$ 380.1621, found 380.1614.

**5-bromo-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one. (21)**



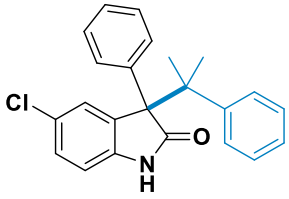

According to general procedure A, isolated yield 90% (36.5 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.56 (s, 1H), 7.76 (dd, *J* = 6.0, 3.5 Hz, 2H), 7.36 – 7.29 (m, 4H), 7.21 (t, *J* = 7.2 Hz, 1H), 7.15 (t, *J* = 7.4 Hz, 2H), 6.81 (d, *J* = 7.5 Hz, 2H), 6.71 (d, *J* = 8.2 Hz, 1H), 6.50 (s, 1H), 1.70 (s, 3H), 1.39 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 178.90, 143.87, 140.00, 134.59, 132.37, 131.81, 130.69, 130.05, 128.44, 127.52, 127.45, 127.03, 126.86, 113.63, 110.60, 62.77, 45.19, 25.39, 24.78.

**HRMS** (ESI) calcd for $C_{23}H_{20}BrNO$ $(M+Na)^+$ 428.0620, found 428.0617.

**5-chloro-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one. (22)**



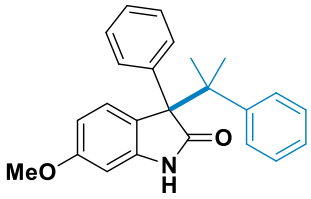

According to general procedure A, isolated yield 93% (33.6 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.70 (s, 1H), 7.77 (dd, *J* = 5.9, 3.4 Hz, 2H), 7.37 – 7.28 (m, 3H), 7.24 – 7.10 (m, 4H), 6.82 (d, *J* = 7.6 Hz, 2H), 6.76 (d, *J* = 8.3 Hz, 1H), 6.40 (s, 1H), 1.70 (s, 3H), 1.40 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.14, 143.90, 139.59, 134.63, 132.01, 130.05, 129.06, 128.43, 127.83, 127.51, 127.44, 127.03, 126.85, 126.27, 110.13, 62.82, 45.17, 25.43, 24.78.

**HRMS** (ESI) calcd for $C_{23}H_{20}ClNO$ $(M+Na)^+$ 384.1126, found 384.1120.

**6-methoxy-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one. (23)**



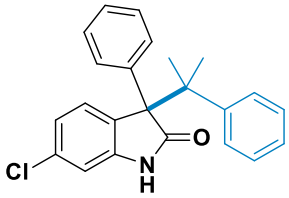
According to general procedure A, isolated yield 87% (31.0 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, DMSO) δ 10.40 (s, 1H), 7.79 – 7.71 (m, 2H), 7.35 – 7.25 (m, 3H), 7.24 – 7.10 (m, 3H), 6.80 (d, *J* = 7.5 Hz, 2H), 6.63 (d, *J* = 7.6 Hz, 1H), 6.41 (dd, *J* = 8.5, 2.3 Hz, 1H), 6.27 (d, *J* = 2.3 Hz, 1H), 3.69 (s, 3H), 1.56 (s, 3H), 1.33 (s, 3H).

**$^{13}$C NMR** (101 MHz, DMSO) δ 178.81, 159.57, 144.93, 143.63, 136.72, 130.19, 129.20, 128.35, 127.60, 127.44, 127.24, 126.72, 122.38, 105.70, 96.12, 61.52, 55.51, 44.61, 25.94, 25.11.

**HRMS** (ESI) calcd for $C_{24}H_{23}NO_2$ $(M+Na)^+$ 380.1621, found 380.1627.

**6-chloro-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one. (24)**



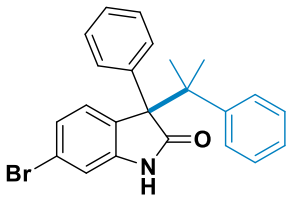
According to general procedure A, isolated yield 85% (30.7 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.38 (s, 1H), 7.79 (dd, *J* = 6.7, 2.9 Hz, 2H), 7.36 – 7.27 (m, 3H), 7.22 – 7.15 (m, 2H), 7.12 (t, *J* = 7.4 Hz, 2H), 6.87 – 6.75 (m, 3H), 6.39 (d, *J* = 7.6 Hz, 1H), 1.71 (s, 3H), 1.42 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 178.12, 144.11, 138.80, 134.75, 131.78, 130.13, 128.51, 127.80, 127.47, 127.38, 126.99, 126.95, 126.69, 121.53, 114.66, 63.64, 45.21, 25.45, 24.84.

**HRMS** (ESI) calcd for $C_{23}H_{20}ClNO$ $(M+Na)^+$ 384.1126, found 384.1123.

**6-bromo-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one. (25)**



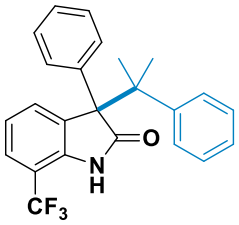
According to general procedure A, isolated yield 67% (27.2 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.48 (s, 1H), 7.75 (dd, *J* = 6.5, 2.8 Hz, 2H), 7.34 – 7.28 (m, 3H), 7.19 (t, *J* = 7.1 Hz, 1H), 7.12 (t, *J* = 7.5 Hz, 2H), 7.04 – 6.97 (m, 2H), 6.80 (d, *J* = 7.7 Hz, 2H), 6.29 (d, *J* = 8.1 Hz, 1H), 1.69 (s, 3H), 1.39 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.07, 144.14, 142.28, 134.73, 130.08, 129.97, 129.30, 128.49, 127.48, 127.39, 127.01, 126.72, 123.75, 121.58, 112.62, 62.28, 45.04, 25.50, 24.80.

**HRMS** (ESI) calcd for $C_{23}H_{20}BrNO$ $(M+Na)^+$ 428.0620, found 428.0620.

**3-phenyl-3-(2-phenylpropan-2-yl)-7-(trifluoromethyl)indolin-2-one. (26)**



According to general procedure A, isolated yield 84% (33.2 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

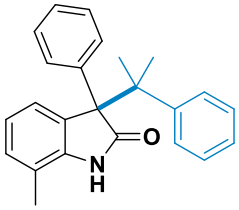
**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.65 (s, 1H), 7.79 (dd, *J* = 6.7, 2.9 Hz, 2H), 7.41 (d, *J* = 8.0 Hz, 1H), 7.40 – 7.27 (m, 3H), 7.21 (t, *J* = 7.2 Hz, 1H), 7.14 (t, *J* = 7.5 Hz, 2H), 6.96 (t, *J* = 7.9 Hz, 1H), 6.80 (d, *J* = 7.6 Hz, 2H), 6.60 (d, *J* = 7.6 Hz, 1H), 1.73 (s, 3H), 1.42 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 178.63, 144.01, 138.63 (d, *J* = 2.0 Hz), 134.45, 131.95, 130.12, 128.41, 127.60, 127.47, 127.06, 126.81, 124.70 (q, *J* = 4.1 Hz), 123.91 (d, *J* = 272.7 Hz), 120.42, 111.59 (q, *J* = 33.2 Hz), 61.47, 45.28, 25.40, 24.69.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ -60.91.

**HRMS** (ESI) calcd for $C_{24}H_{20}F_3NO$ $(M+H)^+$ 396.1570, found 396.1569.

**7-methyl-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one. (27)**



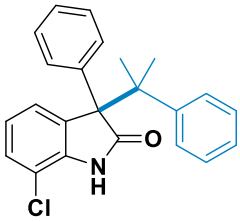
According to general procedure A, isolated yield 91% (31.0 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 9.68 (s, 1H), 7.87 (dd, *J* = 6.4, 3.0 Hz, 2H), 7.34 – 7.27 (m, 3H), 7.16 (t, *J* = 7.1 Hz, 1H), 7.10 (t, *J* = 7.4 Hz, 2H), 7.03 (d, *J* = 7.6 Hz, 1H), 6.86 - 6.74 (m, 3H), 6.34 (d, *J* = 7.5 Hz, 1H), 2.33 (s, 3H), 1.73 (s, 3H), 1.43 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 180.38, 144.58, 140.07, 135.64, 130.32, 130.00, 129.15, 128.60, 127.22, 127.17, 126.78, 126.45, 126.18, 120.65, 118.83, 62.88, 45.00, 25.63, 24.94, 16.57.

**HRMS** (ESI) calcd for $C_{24}H_{23}NO$ $(M+Na)^+$ 364.1672, found 364.1674.

**7-chloro-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one. (28)**



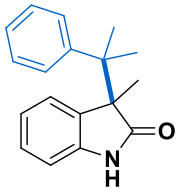
According to general procedure A, isolated yield 91% (32.9 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.42 (s, 1H), 7.70 (dd, *J* = 6.6, 2.8 Hz, 2H), 7.24 – 7.18 (m, 3H), 7.12 – 7.06 (m, 2H), 7.02 (t, *J* = 7.5 Hz, 2H), 6.80 – 6.70 (m, 3H), 6.30 (d, *J* = 7.6 Hz, 1H), 1.61 (s, 3H), 1.33 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 178.25, 144.12, 138.86, 134.76, 131.80, 130.14, 128.51, 127.82, 127.47, 127.38, 126.98, 126.95, 126.69, 121.53, 114.70, 63.66, 45.22, 25.46, 24.84.

**HRMS** (ESI) calcd for $C_{23}H_{20}ClNO$ $(M+Na)^+$ 384.1126, found 384.1122.

**3-methyl-3-(2-phenylpropan-2-yl)indolin-2-one. (29)**



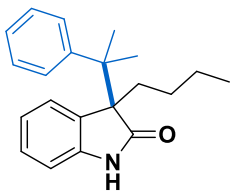
According to general procedure B, isolated yield for 0.1 mmol scale ($^n$$Bu_4NI$, 27%, 7.1 mg ; $^n$$Bu_4NCl$, 57%, 15.1 mg; $^n$$Bu_4NBr$, 61%, 16.2 mg) , white solid, eluent (PE : EA : DCM = 10 : 1 : 11).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 7.54 (s, 1H), 7.20 – 7.06 (m, 6H), 6.85 (td, *J* = 7.6, 1.0 Hz, 1H), 6.68 (d, *J* = 7.7 Hz, 1H), 6.51 (d, *J* = 7.5 Hz, 1H), 1.64 (s, 3H), 1.46 (d, *J* = 10.8 Hz, 6H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 181.79, 144.39, 140.58, 133.50, 127.90, 127.61, 127.04, 126.29, 125.58, 121.22, 108.76, 54.56, 42.65, 23.76, 23.70, 18.61.

**HRMS** (ESI) calcd for $C_{18}H_{19}NO$ $(M+Na)^+$ 288.1359, found 288.1357.

**3-butyl-3-(2-phenylpropan-2-yl)indolin-2-one. (30)**



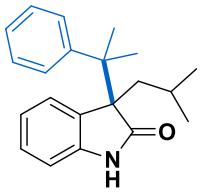
According to general procedure B, isolated yield for 0.1 mmol scale ($^n$$Bu_4NI$, 14%, 4.3 mg ; $^n$$Bu_4NCl$, 38%, 11.7 mg; $^n$$Bu_4NBr$, 43%, 13.2 mg) , white solid, eluent (PE : EA : DCM = 10 : 1 : 11).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 7.87 (s, 1H), 7.18 – 7.04 (m, 6H), 6.87 (td, *J* = 7.6, 0.9 Hz, 1H), 6.67 (d, *J* = 7.7 Hz, 1H), 6.51 (d, *J* = 7.5 Hz, 1H), 2.21 (td, *J* = 12.5, 4.3 Hz, 1H), 1.85 (td, *J* = 12.6, 4.3 Hz, 1H), 1.63 (s, 3H), 1.47 (s, 3H), 1.25 – 1.09 (m, 2H), 0.91 – 0.77 (m, 1H), 0.72 (t, *J* = 7.4 Hz, 3H), 0.58 – 0.43 (m, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 181.35, 144.59, 141.56, 131.34, 128.00, 127.52, 126.92, 126.18, 125.68, 121.09, 108.73, 5A9.74, 43.14, 31.31, 27.16, 23.85, 23.07, 13.86.

**HRMS** (ESI) calcd for $C_{21}H_{25}NO$ $(M+Na)^+$ 330.1828, found 330.1820.

**3-isobutyl-3-(2-phenylpropan-2-yl)indolin-2-one. (31)**



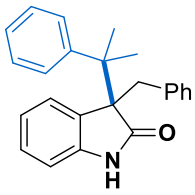
According to general procedure B, isolated yield for 0.1 mmol scale ($^n$Bu$_4$NI, 31%, 9.6 mg ; $^n$Bu$_4$NCl, 49%, 15.0 mg; $^n$Bu$_4$NBr, 43%, 13.2 mg) , white solid, eluent (PE : EA : DCM = 10 : 1 : 11).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.01 (s, 1H), 7.16 – 7.08 (m, 4H), 7.01 (m, 2H), 6.88 (td, *J* = 7.6, 0.9 Hz, 1H), 6.67 (d, *J* = 7.7 Hz, 1H), 6.60 (d, *J* = 7.4 Hz, 1H), 2.11 (dd, *J* = 13.6, 7.9 Hz, 1H), 1.93 (dd, *J* = 13.6, 4.8 Hz, 1H), 1.60 (s, 3H), 1.47 (s, 3H), 1.20 – 1.07 (m, 1H), 0.63 (dd, *J* = 18.6, 6.6 Hz, 6H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 181.83, 144.30, 141.62, 130.93, 128.07, 127.60, 126.82, 126.51, 126.17, 120.74, 108.90, 58.94, 43.82, 39.49, 25.68, 24.60, 23.76, 23.50, 22.81.

**HRMS** (ESI) calcd for $C_{21}H_{25}NO$ $(M+Na)^+$ 330.1828, found 330.1820.

**3-benzyl-3-(2-phenylpropan-2-yl)indolin-2-one. (32)**



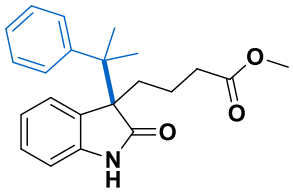
According to general procedure B, isolated yield for 0.1 mmol scale ($^n$Bu$_4$NI, 29%, 9.9 mg ; $^n$Bu$_4$NCl, 47%, 16.0 mg; $^n$Bu$_4$NBr, 47%, 16.0 mg) , white solid, eluent (PE : EA : DCM = 10 : 1 : 11).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 7.34 (s, 1H), 7.25 – 7.17 (m, 5H), 7.01 (td, *J* = 7.7, 1.2 Hz, 1H), 6.96 – 6.88 (m, 3H), 6.81 (m, 3H), 6.55 (d, *J* = 7.5 Hz, 1H), 6.41 (d, *J* = 7.7 Hz, 1H), 3.60 (d, *J* = 12.6 Hz, 1H), 3.14 (d, *J* = 12.6 Hz, 1H), 1.79 (s, 3H), 1.51 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.93, 144.53, 141.22, 136.41, 130.28, 130.09, 128.34, 127.65, 127.40, 127.14, 126.76, 126.41, 126.02, 120.65, 108.60, 61.08, 43.37, 37.73, 24.27, 23.93.

**HRMS** (ESI) calcd for $C_{24}H_{23}NO$ $(M+Na)^+$ 364.1672, found 364.1663.

**methyl 4-(2-oxo-3-(2-phenylpropan-2-yl)indolin-3-yl)butanoate. (33)**



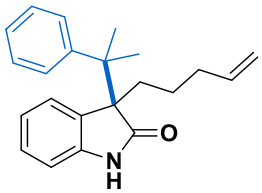
According to general procedure B, isolated yield for 0.1 mmol scale ($^n$Bu$_4$NI, 24%, 8.4 mg ; $^n$Bu$_4$NCl, 39%, 13.7 mg; $^n$Bu$_4$NBr, 46%, 16.1 mg) , colorless oil, eluent (PE : EA : DCM = 10 : 1 : 11).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 7.87 (s, 1H), 7.17 – 7.09 (m, 4H), 7.08 – 7.01 (m, 2H), 6.89 (td, *J* = 7.6, 1.0 Hz, 1H), 6.66 (d, *J* = 7.5 Hz, 1H), 6.56 (d, *J* = 7.5 Hz, 1H), 3.58 (s, 3H), 2.29 – 2.10 (m, 3H), 1.98 – 1.87 (m, 1H), 1.61 (s, 3H), 1.47 (s, 3H), 1.24 – 1.10 (m, 1H), 0.99 – 0.85 (m, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 180.87, 173.53, 144.30, 141.51, 130.65, 127.94, 127.80, 126.96, 126.28, 125.76, 121.28, 108.94, 59.56, 51.45, 43.20, 34.10, 30.87, 23.82, 23.75, 20.59.

**HRMS** (ESI) calcd for $C_{22}H_{25}NO_3$ $(M+Na)^+$ 374.1727, found 374.1722.

**3-(pent-4-en-1-yl)-3-(2-phenylpropan-2-yl)indolin-2-one. (34)**



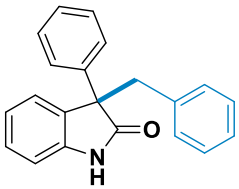
According to general procedure B, isolated yield for 0.1 mmol scale ($^n$Bu$_4$NI, 16%, 5.1 mg ; $^n$Bu$_4$NCl, 48%, 15.3 mg; $^n$Bu$_4$NBr, 52%, 16.6 mg) , colorless oil, eluent (PE : EA : DCM = 10 : 1 : 11).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.21 (s, 1H), 7.19 – 7.00 (m, 6H), 6.87 (td, *J* = 7.6, 1.0 Hz, 1H), 6.69 (d, *J* = 7.6 Hz, 1H), 6.51 (d, *J* = 7.5 Hz, 1H), 5.67 – 5.52 (m, 1H), 4.94 – 4.80 (m, 2H), 2.22 (td, *J* = 12.6, 4.3 Hz, 1H), 2.03 – 1.83 (m, 3H), 1.63 (s, 3H), 1.47 (s, 3H), 1.03 – 0.90 (m, 1H), 0.69 – 0.56 (m, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 181.49, 144.51, 141.65, 138.28, 131.16, 127.98, 127.62, 126.94, 126.23, 125.66, 121.15, 114.64, 108.89, 59.72, 43.17, 33.96, 31.04, 24.30, 23.86.

**HRMS** (ESI) calcd for $C_{22}H_{25}NO$ $(M+Na)^+$ 342.1828, found 342.1822.

**3-benzyl-3-phenylindolin-2-one. (35)**



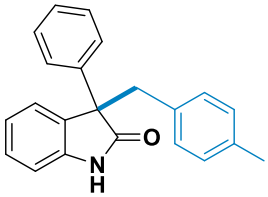
According to general procedure A, isolated yield 93% (27.8 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.10 – 7.96 (m, 1H), 7.49 (d, *J* = 7.5 Hz, 2H), 7.39 – 7.27 (m, 3H), 7.17 (dd, *J* = 17.8, 7.6 Hz, 2H), 7.10 – 6.98 (m, 4H), 6.90 (d, *J* = 7.2 Hz, 2H), 6.70 (d, *J* = 7.7 Hz, 1H), 3.72 (d, *J* = 12.9 Hz, 1H), 3.49 (d, *J* = 12.9 Hz, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.96, 140.82, 139.78, 135.63, 131.92, 130.17, 128.66, 128.19, 127.64, 127.51, 127.15, 126.61, 125.85, 122.21, 109.79, 58.64, 43.53.

**HRMS** (ESI) calcd for $C_{21}H_{17}NO$ $(M+Na)^+$ 322.1202, found 322.1196.

**3-(4-methylbenzyl)-3-phenylindolin-2-one. (36)**



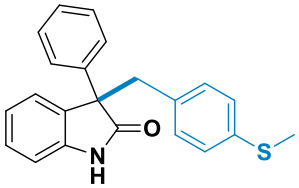
According to general procedure A, isolated yield 92% (28.8 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.27 (s, 1H), 7.51 – 7.46 (m, 2H), 7.37 – 7.27 (m, 3H), 7.22 – 7.14 (m, 2H), 7.09 – 7.05 (m, 1H), 6.84 – 6.76 (m, 4H), 6.72 (d, *J* = 7.7 Hz, 1H), 3.67 (d, *J* = 13.0 Hz, 1H), 3.47 (d, *J* = 13.0 Hz, 1H), 2.17 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 180.32, 140.96, 139.89, 136.07, 132.50, 132.12, 130.03, 128.64, 128.37, 128.12, 127.45, 127.17, 125.78, 122.15, 109.95, 58.71, 43.10, 21.01.

**HRMS** (ESI) calcd for $C_{22}H_{19}NO$ $(M+Na)^+$ 336.1359, found 336.1359.

**3-(4-(methylthio)benzyl)-3-phenylindolin-2-one. (37)**



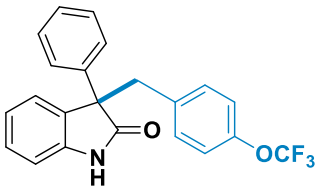
According to general procedure A, isolated yield 84% (29.0 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.27 (s, 1H), 7.52 – 7.43 (m, 2H), 7.37 – 7.27 (m, 3H), 7.21 – 7.14 (m, 2H), 7.10 – 7.03 (m, 1H), 6.90 (d, *J* = 8.3 Hz, 2H), 6.81 (d, *J* = 8.3 Hz, 2H), 6.71 (d, *J* = 7.7 Hz, 1H), 3.65 (d, *J* = 13.0 Hz, 1H), 3.46 (d, *J* = 13.0 Hz, 1H), 2.33 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 180.12, 140.89, 139.67, 136.49, 132.44, 131.91, 130.63, 128.69, 128.25, 127.53, 127.11, 125.74, 122.24, 110.04, 58.61, 42.94, 15.60.

**HRMS** (ESI) calcd for $C_{22}H_{19}NOS$ $(M+Na)^+$ 368.1080, found 368.1072.

**3-phenyl-3-(4-(trifluoromethoxy)benzyl)indolin-2-one. (38)**



According to general procedure A, isolated yield 93% (35.6 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

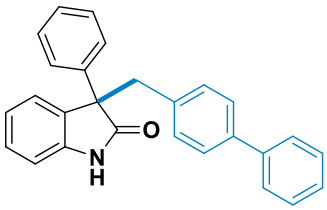
**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 7.90 (s, 1H), 7.51 – 7.45 (m, 2H), 7.38 – 7.27 (m, 3H), 7.22 – 7.15 (m, 2H), 7.11 – 7.05 (m, 1H), 6.94 – 6.84 (m, 4H), 6.71 (d, *J* = 7.6 Hz, 1H), 3.72 (d, *J* = 13.0 Hz, 1H), 3.47 (d, *J* = 13.0 Hz, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.59, 148.02, 140.71, 139.36, 134.34, 131.50, 131.47, 128.75, 128.45, 127.67, 127.07, 125.71, 122.40, 120.01, 109.93, 58.47, 42.74.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ -57.89.

**HRMS** (ESI) calcd for $C_{22}H_{16}F_3NO_2$ $(M+Na)^+$ 406.1025, found 406.1021.

**3-([1,1'-biphenyl]-4-ylmethyl)-3-phenylindolin-2-one. (39)**



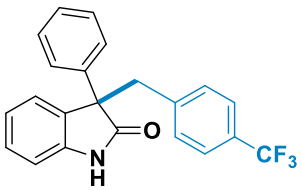
According to general procedure A, isolated yield 81% (30.4 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^{1}$H NMR** (400 MHz, DMSO) δ 10.34 (s, 1H), 7.56 (d, *J* = 7.6 Hz, 2H), 7.46 (d, *J* = 7.6 Hz, 2H), 7.43 -7.33 (m, 7H), 7.30 (dd, *J* = 13.3, 7.0 Hz, 2H), 7.12 (t, *J* = 7.6 Hz, 1H), 7.01 (dd, *J* = 7.3, 5.2 Hz, 3H), 6.68 (d, *J* = 7.7 Hz, 1H), 3.64 – 3.56 (m, 2H).

**$^{13}$C NMR** (101 MHz, DMSO) δ 179.22, 142.38, 141.47, 140.00, 138.35, 136.14, 132.43, 131.07, 129.32, 128.95, 128.52, 127.72, 127.56, 127.23, 126.80, 126.06, 126.01, 121.88, 109.91, 58.56, 42.11.

**HRMS** (ESI) calcd for $C_{27}H_{21}NO$ $(M+Na)^+$ 398.1515, found 398.1511.

**3-phenyl-3-(4-(trifluoromethyl)benzyl)indolin-2-one. (40)**



According to general procedure A, isolated yield 88% (32.3 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

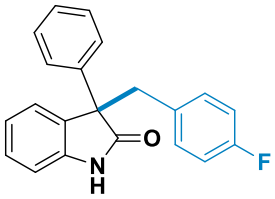
**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 8.10 (s, 1H), 7.50 -7.44 (m, 2H), 7.38 – 7.26 (m, 5H), 7.23 – 7.16 (m, 2H), 7.08 (td, *J* = 7.6, 0.9 Hz, 1H), 7.01 (d, *J* = 8.0 Hz, 2H), 6.72 (d, *J* = 7.7 Hz, 1H), 3.76 (d, *J* = 12.9 Hz, 1H), 3.53 (d, *J* = 12.9 Hz, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.62, 140.70, 139.81 (d, *J* = 1.0 Hz), 139.31, 131.35, 130.49, 128.90 (d, *J* = 32.3 Hz), 128.78, 128.53, 127.73, 127.04, 125.70, 124.55 (q, *J* = 3.7 Hz), 124.15 (d, *J* = 272.7 Hz), 122.45, 110.10, 58.36, 43.15.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ -62.46.

**HRMS** (ESI) calcd for $C_{22}H_{16}F_3NO$ $(M+Na)^+$ 390.1076, found 390.1071.

**3-(4-fluorobenzyl)-3-phenylindolin-2-one. (41)**




According to general procedure A, isolated yield 84% (36.6 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

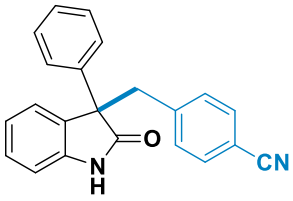
**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 8.14 (s, 1H), 7.50 – 7.44 (m, 2H), 7.38 – 7.27 (m, 3H), 7.22 -7.15 (m, 2H), 7.07 (td, *J* = 7.7, 1.0 Hz, 1H), 6.88 – 6.81 (m, 2H), 6.75 - 6.65 (m, 3H), 3.69 (d, *J* = 13.0 Hz, 1H), 3.45 (d, *J* = 13.0 Hz, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.99, 161.73 (d, *J* = 246.4 Hz), 140.83, 139.52, 131.76, 131.62 (d, *J* = 8.1 Hz), 131.29 (d, *J* = 4.0 Hz), 128.72, 128.34, 127.61, 127.09, 125.70, 122.34, 114.49 (d, *J* = 21.2 Hz), 109.95, 58.65, 42.63.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ -116.14.

**HRMS** (ESI) calcd for $C_{21}H_{16}FNO$ $(M+Na)^+$ 340.1108, found 340.1109.

**4-((2-oxo-3-phenylindolin-3-yl)methyl)benzonitrile. (42)**



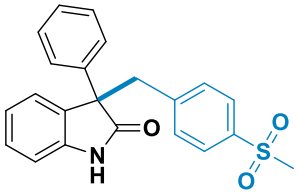

According to general procedure A, isolated yield 74% (23.9 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^{1}$H NMR** (400 MHz, DMSO) δ 10.38 (s, 1H), 7.58 – 7.53 (m, 2H), 7.46 – 7.33 (m, 5H), 7.32 – 7.26 (m, 1H), 7.16 – 7.08 (m, 3H), 7.00 (td, *J* = 7.5, 1.0 Hz, 1H), 6.67 (d, *J* = 7.6 Hz, 1H), 3.67 (q, *J* = 12.6 Hz, 2H).

**$^{13}$C NMR** (101 MHz, DMSO) δ 178.92, 142.86, 142.16, 141.01, 131.83, 131.45, 129.01, 128.76, 127.71, 127.19, 126.05, 122.04, 119.21, 109.98, 109.75, 58.43, 42.17.

**HRMS** (ESI) calcd for $C_{22}H_{16}N_2O$ $(M+Na)^+$ 347.1155, found 347.1150.

**3-(4-(methylsulfonyl)benzyl)-3-phenylindolin-2-one. (43)**



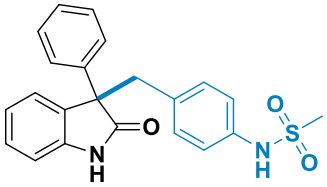
According to general procedure A, isolated yield 79% (29.8 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.32 (s, 1H), 7.61 (d, *J* = 8.3 Hz, 2H), 7.46 (d, *J* = 7.2 Hz, 2H), 7.39 – 7.27 (m, 3H), 7.24 – 7.14 (m, 2H), 7.14 -7.05 (m, 3H), 6.71 (d, *J* = 7.7 Hz, 1H), 3.80 (d, *J* = 12.8 Hz, 1H), 3.53 (d, *J* = 12.7 Hz, 1H), 2.94 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.52, 142.34, 140.71, 139.15, 138.68, 131.17, 131.01, 128.85, 128.74, 127.84, 127.01, 126.72, 125.59, 122.56, 110.34, 58.33, 44.37, 43.13.

**HRMS** (ESI) calcd for $C_{22}H_{19}NO_3S$ $(M+Na)^+$ 400.0978, found 400.0981.

***N*-(4-((2-oxo-3-phenylindolin-3-yl)methyl)phenyl)methanesulfonamide. (44)**



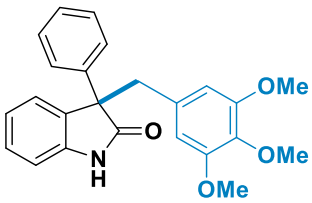
According to general procedure A, isolated yield 90% (35.2 mg, 0.1 mmol scale), white solid, eluent (PE : EA = 2 : 1).

**$^1$H NMR** (400 MHz, DMSO) δ 10.31 (s, 1H), 9.52 (s, 1H), 7.46 – 7.40 (m, 2H), 7.38 – 7,32 (m, 3H), 7.30 – 7.25 (m, 1H), 7.11 (td, *J* = 7.7, 1.0 Hz, 1H), 6.98 (td, *J* = 7.5, 0.7 Hz, 1H), 6.91 – 6.81 (m, 4H), 6.66 (d, *J* = 7.7 Hz, 1H), 3.50 (s, 2H), 2.86 (s, 3H).

**$^{13}$C NMR** (101 MHz, DMSO) δ 179.23, 142.38, 141.31, 137.05, 132.40, 132.28, 131.21, 128.93, 128.49, 127.54, 127.25, 125.99, 121.82, 119.45, 109.82, 58.61, 41.91, 39.51.

**HRMS** (ESI) calcd for $C_{22}H_{20}N_2O_3S$ $(M+Na)^+$ 415.1087, found 415.1085.

**3-phenyl-3-(3,4,5-trimethoxybenzyl)indolin-2-one. (45)**



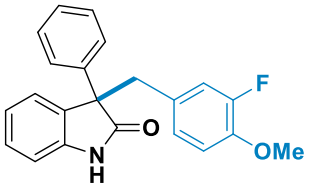
According to general procedure A, isolated yield 80% (31.1 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 7.73 (s, 1H), 7.52 – 7.48 (m, 2H), 7.39 – 7.33 (m, 2H), 7.32 – 7.27 (m, 1H), 7.21 – 7.15 (m, 2H), 7.10 – 7.05 (m, 1H), 6.74 (d, *J* = 7.6 Hz, 1H), 6.07 (s, 2H), 3.73 (s, 3H), 3.59 (d, *J* = 13.0 Hz, 1H), 3.56 (s, 6H), 3.45 (d, *J* = 12.9 Hz, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.63, 152.21, 141.13, 139.48, 136.55, 131.99, 131.16, 128.67, 128.26, 127.54, 127.23, 125.86, 122.01, 110.02, 107.20, 60.76, 58.52, 55.80, 44.06, 33.93, 25.62, 24.95.

**HRMS** (ESI) calcd for $C_{24}H_{23}NO_4$ $(M+Na)^+$ 415.1519, found 415.1517.

**3-(3-fluoro-4-methoxybenzyl)-3-phenylindolin-2-one. (46)**




According to general procedure A, isolated yield 64% (22.2 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

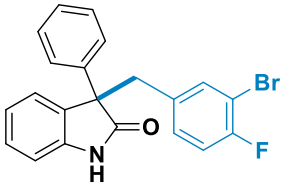
**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 8.63 (s, 1H), 7.48 – 7.42 (m, 2H), 7.37 – 7.27 (m, 3H), 7.20 – 7.15 (m, 2H), 7.12 – 7.03 (m, 1H), 6.76 – 6.70 (m, 1H), 6.66 (d, *J* = 8.4 Hz, 1H), 6.60 – 6.52 (m, 2H), 3.69 (s, 3H), 3.63 (d, *J* = 13.1 Hz, 1H), 3.42 (d, *J* = 13.1 Hz, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 180.35, 151.37 (d, *J* = 245.4 Hz), 146.24 (d, *J* = 11.1 Hz), 140.98, 139.56, 131.87, 128.73, 128.56 (d, *J* = 6.1 Hz), 128.38, 127.59, 127.05, 125.98 (d, *J* = 3.0 Hz), 125.54, 122.37, 117.59 (d, *J* = 19.2 Hz), 112.39, 110.20.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ -136.19.

**HRMS** (ESI) calcd for $C_{22}H_{18}FNO_2$ $(M+Na)^+$ 370.1214, found 370.1220.

**3-(3-bromo-4-fluorobenzyl)-3-phenylindolin-2-one. (47)**




According to general procedure A, isolated yield 85% (33.6 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

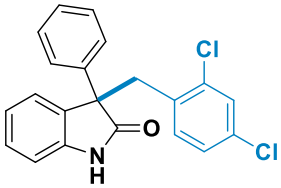
**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 7.98 (s, 1H), 7.49 – 7.43 (m, 2H), 7.39 – 7.28 (m, 3H), 7.24 – 7.18 (m, 2H), 7.10 (td, *J* = 7.7, 1.0 Hz, 1H), 7.05 (dd, *J* = 6.7, 2.1 Hz, 1H), 6.84 – 6.79 (m, 1H), 6.78 – 6.73 (m, 2H), 3.67 (d, *J* = 13.0 Hz, 1H), 3.40 (d, *J* = 13.0 Hz, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.43, 159.97 (d, *J* = 248.5 Hz), 140.72, 139.15, 134.99, 133.06 (d, *J* = 4.0 Hz), 131.28, 130.66 (d, *J* = 8.1 Hz), 128.78, 128.59, 127.74, 127.06, 125.67, 122.49, 115.56 (d, *J* = 22.2 Hz), 110.11, 108.00 (d, *J* = 21.2 Hz), 58.42, 42.36.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ -110.24.

**HRMS** (ESI) calcd for $C_{21}H_{15}BrFNO$ $(M+Na)^+$ 418.0213, found 418.0205.

**3-(2,4-dichlorobenzyl)-3-phenylindolin-2-one. (48)**



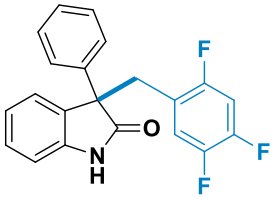

According to general procedure A, isolated yield 82% (30.2 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.05 (s, 1H), 7.51 – 7.46 (m, 2H), 7.39 – 7.28 (m, 3H), 7.23 – 7.15 (m, 3H), 7.05 – 6,98 (m, 2H), 6.96 – 6,90 (m, 1H), 6.77 (d, *J* = 7.7 Hz, 1H), 3.82 (s, 2H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.87, 140.38, 139.42, 135.54, 133.05, 132.81, 131.48, 130.56, 129.14, 128.74, 128.53, 127.72, 127.13, 126.65, 126.59, 122.27, 109.72, 57.93, 38.67.

**HRMS** (ESI) calcd for $C_{21}H_{15}Cl_2NO$ $(M+Na)^+$ 390.0423, found 390.0415.

**3-phenyl-3-(2,4,5-trifluorobenzyl)indolin-2-one. (49)**




According to general procedure A, isolated yield 88% (31.1 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

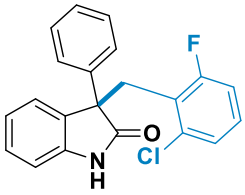
**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.15 (s, 1H), 7.49 – 7.43 (m, 2H), 7.39 – 7.28 (m, 3H), 7.24 (s, 1H), 7.19 (td, *J* = 7.7, 1.1 Hz, 1H), 7.05 (td, *J* = 7.6, 0.8 Hz, 1H), 6.95 – 6.86 (m, 1H), 6.77 (d, *J* = 7.7 Hz, 1H), 6.68 – 6.58 (m, 1H), 3.63 (q, *J* = 13.6 Hz, 2H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.72, 140.47, 139.22, 130.78, 128.78, 128.60, 127.80, 126.94, 125.99, 125.96, 122.50, 119.8 – 119.4 (m, 1C), 118.9 – 118.5 (m, 1C), 109.83, 104.89 (dd, *J* = 29.5, 20.6 Hz), 57.89, 34.75.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ -116.29, -116.30, -116.33, -116.34, -135.01, -135.02, -135.06, -135.07, -142.87, -142.91, -142.93, -142.97.

**HRMS** (ESI) calcd for $C_{21}H_{14}F_3NO$ $(M+Na)^+$ 376.0920, found 376.0912.

**3-(2-chloro-6-fluorobenzyl)-3-phenylindolin-2-one. (50)**



According to general procedure A, isolated yield 67% (23.6 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

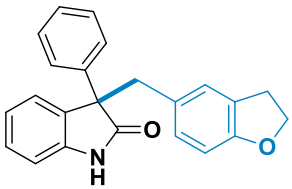
**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 8.27 (s, 1H), 7.54 – 7.49 (m, 2H), 7.37 – 7.27 (m, 3H), 7.13 (t, *J* = 7.6 Hz, 2H), 7.02 – 6.97 (m, 2H), 6.94 – 6.89 (m, 1H), 6.80 (d, *J* = 7.5 Hz, 1H), 6.77 – 6.70 (m, 1H), 3.96 (ddd, *J* = 40.2, 13.9, 1.6 Hz, 2H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 180.31, 161.76 (d, *J* = 250.5 Hz), 140.90, 140.30, 136.18 (d, *J* = 6.4 Hz), 130.57, 128.60, 128.51, 128.28, 127.50, 127.24, 126.61 (d, *J* = 1.7 Hz), 125.11 (d, *J* = 3.3 Hz), 123.57 (d, *J* = 19.6 Hz), 121.87, 113.66 (d, *J* = 23.5 Hz), 109.63, 56.69, 35.41.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ -106.51.

**HRMS** (ESI) calcd for $C_{21}H_{15}ClFNO$ $(M+Na)^+$ 374.0718, found 374.0713.

**3-((2,3-dihydrobenzofuran-5-yl)methyl)-3-phenylindolin-2-one. (51)**



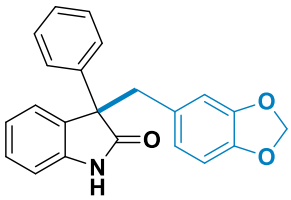
According to general procedure A, isolated yield 83% (28.3 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 8.32 (s, 1H), 7.51- 7.45 (m, 2H), 7.37 – 7.31 (m, 2H), 7.31 – 7.27 (m, 1H), 7.22 – 7.13 (m, 2H), 7.06 (td, *J* = 7.6, 0.9 Hz, 1H), 6.78 – 6.70 (m, 2H), 6.58 (dd, *J* = 8.2, 1.6 Hz, 1H), 6.41 (d, *J* = 8.2 Hz, 1H), 4.39 (td, *J* = 8.8, 3.0 Hz, 2H), 3.64 (d, *J* = 13.1 Hz, 1H), 3.43 (d, *J* = 13.1 Hz, 1H), 2.91 (t, *J* = 8.7 Hz, 2H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 180.37, 158.75, 140.99, 139.86, 132.17, 129.78, 128.65, 128.12, 127.46, 127.17, 126.66, 126.27, 125.78, 122.16, 109.94, 108.24, 71.06, 58.93, 43.05, 29.47.

**HRMS** (ESI) calcd for $C_{23}H_{19}NO_2$ $(M+Na)^+$ 364.1308, found 364.1305.

**3-(benzo[d][1,3]dioxol-5-ylmethyl)-3-phenylindolin-2-one. (52)**



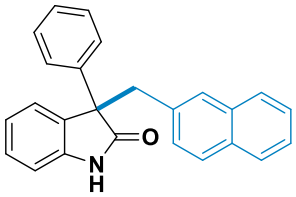
According to general procedure A, isolated yield 90% (30.9 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 7.94 (s, 1H), 7.50 – 7.44 (m, 2H), 7.34 (t, *J* = 7.4 Hz, 2H), 7.28 (t, *J* = 4.9 Hz, 1H), 7.18 (t, *J* = 7.2 Hz, 2H), 7.07 (t, *J* = 7.5 Hz, 1H), 6.75 (d, *J* = 7.5 Hz, 1H), 6.47 (d, *J* = 8.4 Hz, 1H), 6.42 – 6.35 (m, 2H), 5.79 (dd, *J* = 8.9, 1.3 Hz, 2H), 3.64 (d, *J* = 13.1 Hz, 1H), 3.41 (d, *J* = 13.1 Hz, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.89, 146.85, 146.17, 140.85, 139.71, 131.88, 129.33, 128.66, 128.23, 127.51, 127.11, 125.77, 123.51, 122.28, 110.42, 109.91, 107.54, 100.67, 58.66, 43.27.

**HRMS** (ESI) calcd for $C_{22}H_{17}NO_3$ $(M+Na)^+$ 366.1101, found 366.1094.

**3-(naphthalen-2-ylmethyl)-3-phenylindolin-2-one. (53)**



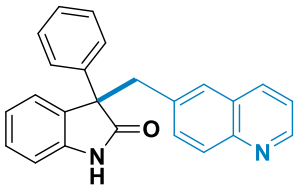
According to general procedure A, isolated yield 93% (32.4 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 7.70 – 7.65 (m, 1H), 7.63 – 7.54 (m, 2H), 7.54 – 7.46 (m, 3H), 7.42 – 7.26 (m, 7H), 7.16 – 7.04 (m, 2H), 6.99 (dd, *J* = 8.4, 1.7 Hz, 1H), 6.60 (d, *J* = 7.3 Hz, 1H), 3.87 (d, *J* = 12.9 Hz, 1H), 3.64 (d, *J* = 12.9 Hz, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.57, 140.71, 139.74, 133.29, 133.02, 132.19, 131.85, 129.09, 128.70, 128.47, 128.25, 127.76, 127.56, 127.40, 127.19, 126.98, 125.93, 125.63, 125.47, 122.25, 109.82, 58.63, 43.71.

**HRMS** (ESI) calcd for $C_{25}H_{19}NO$ $(M+H)^+$ 350.1539, found 350.1537.

**3-phenyl-3-(quinolin-6-ylmethyl)indolin-2-one. (54)**



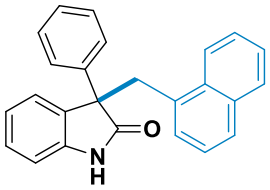
According to general procedure A, isolated yield 73% (25.5 mg, 0.1 mmol scale), white solid, eluent (EA : DCM = 2 : 1).

**$^{1}$H NMR** (400 MHz, DMSO) δ 10.30 (s, 1H), 8.79 (dd, *J* = 4.1, 1.4 Hz, 1H), 8.10 (d, *J* = 8.0 Hz, 1H), 7.68 (d, *J* = 8.7 Hz, 1H), 7.53 – 7.36 (m, 7H), 7.34 – 7.26 (m, 2H), 7.09 (t, *J* = 7.4 Hz, 1H), 7.02 (t, *J* = 7.4 Hz, 1H), 6.58 (d, *J* = 7.6 Hz, 1H), 3.78 (s, 2H).

**$^{13}$C NMR** (101 MHz, DMSO) δ 179.15, 150.53, 147.03, 142.28, 141.28, 136.02, 135.28, 132.36, 132.24, 129.25, 129.01, 128.59, 128.17, 127.67, 127.64, 127.27, 126.10, 121.93, 121.83, 109.87, 58.73, 42.30.

**HRMS** (ESI) calcd for $C_{24}H_{18}N_2O$ $(M+Na)^+$ 373.1311, found 373.1311.

**3-(naphthalen-1-ylmethyl)-3-phenylindolin-2-one. (55)**



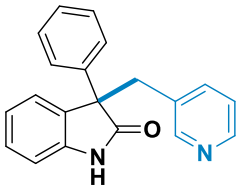
According to general procedure A, isolated yield 89% (31.1 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.11 (s, 1H), 8.09 – 8.02 (m, 1H), 7.74 – 7.66 (m, 1H), 7.63 – 7.53 (m, 3H), 7.42 – 7.30 (m, 5H), 7.15 – 7.00 (m, 4H), 6.86 (td, *J* = 7.6, 0.9 Hz, 1H), 6.62 (d, *J* = 7.7 Hz, 1H), 4.27 (d, *J* = 13.8 Hz, 1H), 3.99 (d, *J* = 13.9 Hz, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 180.35, 140.82, 140.02, 133.54, 132.45, 132.18, 131.60, 128.69, 128.32, 128.10, 127.96, 127.55, 127.46, 127.35, 126.47, 125.25, 125.20, 124.70, 124.49, 121.94, 109.75, 58.43, 38.85.

**HRMS** (ESI) calcd for $C_{25}H_{19}NO$ $(M+H)^+$ 350.1539, found 350.1535.

**3-phenyl-3-(pyridin-3-ylmethyl)indolin-2-one. (56)**



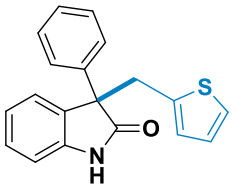
According to general procedure A, isolated yield 74% (22.2 mg, 0.1 mmol scale), white solid, eluent (EA : DCM = 2 : 1).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.31 (d, *J* = 4.1 Hz, 1H), 8.25 – 8.07 (m, 2H), 7.51 – 7.46 (m, 2H), 7.39 – 7.28 (m, 3H), 7.26 (s, 0.5H), 7.25 (s, 0.5H), 7.22 (d, *J* = 7.5 Hz, 1H), 7.17 (td, *J* = 7.7, 1.3 Hz, 1H), 7.08 (td, *J* = 7.6, 0.9 Hz, 1H), 6.97 (dd, *J* = 7.8, 4.8 Hz, 1H), 6.70 (d, *J* = 7.7 Hz, 1H), 3.72 (d, *J* = 13.1 Hz, 1H), 3.45 (d, *J* = 13.1 Hz, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.39, 150.98, 147.92, 140.75, 139.19, 137.60, 131.35, 131.11, 128.77, 128.64, 127.74, 127.08, 125.67, 122.73, 122.55, 110.06, 58.27, 40.74.

**HRMS** (ESI) calcd for $C_{20}H_{16}N_2O$ $(M+Na)^+$ 323.1155, found 323.1150.

**3-phenyl-3-(thiophen-2-ylmethyl)indolin-2-one. (57)**



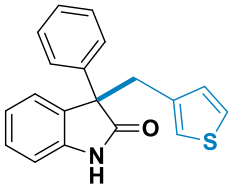
According to general procedure A, isolated yield 78% (23.8 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.33 (s, 1H), 7.51 – 7.46 (m, 2H), 7.39 – 7.27 (m, 3H), 7.23 (dd, *J* = 7.6, 1.3 Hz, 1H), 7.15 (d, *J* = 6.9 Hz, 1H), 7.09 (td, *J* = 7.5, 0.8 Hz, 1H), 6.94 (dd, *J* = 5.1, 1.0 Hz, 1H), 6.83 (d, *J* = 7.7 Hz, 1H), 6.72 (dd, *J* = 5.1, 3.5 Hz, 1H), 6.62 (d, *J* = 3.1 Hz, 1H), 3.90 (d, *J* = 14.2 Hz, 1H), 3.73 (d, *J* = 14.2 Hz, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.90, 141.28, 139.04, 137.44, 131.66, 128.73, 128.54, 127.69, 127.43, 127.18, 126.16, 125.78, 124.57, 122.44, 110.11, 58.22, 37.96.

**HRMS** (ESI) calcd for $C_{19}H_{15}NOS$ $(M+Na)^+$ 328.0767, found 328.0772.

**3-phenyl-3-(thiophen-3-ylmethyl)indolin-2-one. (58)**



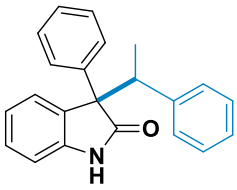
According to general procedure A, isolated yield 84% (25.6 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 7.91 (s, 1H), 7.50 – 7.45 (m, 2H), 7.40 – 7.27 (m, 3H), 7.23 – 7.13 (m, 2H), 7.07 (td, *J* = 7.5, 0.8 Hz, 1H), 6.97 (dd, *J* = 4.9, 3.0 Hz, 1H), 6.77 (d, *J* = 7.7 Hz, 1H), 6.72 – 6.68 (m, 1H), 6.52 (dd, *J* = 4.9, 1.1 Hz, 1H), 3.72 (d, *J* = 13.4 Hz, 1H), 3.54 (d, *J* = 13.4 Hz, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.98, 140.92, 139.42, 135.87, 132.19, 129.16, 128.67, 128.29, 127.55, 127.13, 125.58, 124.30, 123.49, 122.33, 109.85, 58.06, 38.10.

**HRMS** (ESI) calcd for $C_{19}H_{15}NOS$ $(M+Na)^+$ 328.0767, found 328.0763.

**3-phenyl-3-(1-phenylethyl)indolin-2-one. (59)**



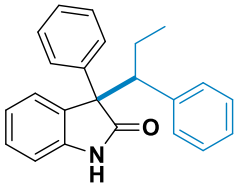
According to general procedure A, isolated yield 97% (30.3 mg, 0.1 mmol scale, dr = 1 : 1), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.51 (s, 0.5H), 7.73 (s, 0.5H), 7.65 – 7.55 (m, 2.5H), 7.40 – 7.26 (m, 3.5H), 7.22 – 7.16 (m, 1H), 7.13 – 6.93 (m, 3.5H), 6.91 – 6.81 (m, 3H), 6.68 (d, *J* = 7.4 Hz, 0.5H), 4.08 (q, *J* = 7.2 Hz, 0.5H), 4.00 (q, *J* = 7.0 Hz, 0.5H), 1.38 (d, *J* = 7.3 Hz, 1.5H), 1.29 (d, *J* = 7.1 Hz, 1.5H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 180.13, 179.38, 141.61, 140.90, 140.40, 140.33, 138.61, 137.96, 129.78, 129.32, 129.22, 128.75, 128.57, 128.53, 128.32, 128.04, 127.93, 127.86, 127.44, 127.43, 127.24, 127.22, 127.16, 126.80, 126.71, 121.77, 121.52, 109.99, 109.71, 62.03, 61.33, 47.12, 46.97, 15.97, 15.45.

**HRMS** (ESI) calcd for $C_{22}H_{19}NO$ $(M+Na)^+$ 336.1359, found 336.1364.

**3-phenyl-3-(1-phenylpropyl)indolin-2-one. (60)**



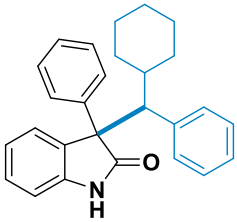
According to general procedure A, isolated yield 96% (31.4 mg, 0.1 mmol scale, dr = 1.1 : 1), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.26 – 8.16 (m, 0.5H), 7.63 – 7.52 (m, 2.5H), 7.47 – 7.27 (m, 3.5H), 7.25 – 6.93 (m, 6.5H), 6.83 – 6,77 (m, *J* = 7.2 Hz, 1H), 6.76 – 6.64 (m, 1H), 3.79 – 3.60 (m, 1H), 1.99 – 1.69 (m, 2H), 0.69 (t, *J* = 7.3 Hz, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 180.00, 178.98, 141.70, 140.24, 138.87, 138.27, 137.87, 131.28, 130.03, 129.53, 129.39, 128.57, 128.50, 128.40, 127.80, 127.77, 127.46, 127.38, 127.29, 127.07, 126.80, 126.62, 126.48, 121.76, 121.66, 109.85, 109.54, 62.17, 61.69, 55.44, 55.16, 22.79, 21.67, 12.64, 12.45.

**HRMS** (ESI) calcd for $C_{23}H_{21}NO$ $(M+Na)^+$ 350.1515, found 350.1520.

**3-(cyclohexyl(phenyl)methyl)-3-phenylindolin-2-one. (61)**



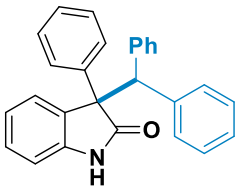
According to general procedure A, isolated yield 85% (32.4 mg, 0.1 mmol scale, dr = 1.1 : 1), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.15 (s, 0.5H), 7.61 – 7.49 (m, 2H), 7.46 – 7.41 (m, 1H), 7.40 – 7.23 (m, 3.5H), 7.21 – 6.90 (m, 6.5H), 6.78 – 6.69 (m, 1H), 3.76 – 3.61 (m, 1H), 2.13 – 1.92 (m, 1H), 1.69 – 1.30 (m, 5H), 1.19 – 0.93 (m, 3H), 0.89 – 0.59 (m, 2H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 180.47, 178.97, 142.17, 140.58, 140.11, 139.97, 139.89, 139.72, 132.44, 129.96, 129.29, 128.65, 128.23, 128.05, 127.53, 127.44, 127.43, 127.34, 127.27, 127.20, 126.68, 126.55, 126.46, 125.93, 122.09, 121.78, 110.03, 109.75, 61.39, 60.86, 59.19, 58.22, 41.13, 40.26, 33.88, 32.89, 32.82, 26.78, 26.58, 26.55, 26.27, 26.18.

**HRMS** (ESI) calcd for $C_{27}H_{27}NO$ $(M+Na)^+$ 404.1985, found 404.1984.

**3-benzhydryl-3-phenylindolin-2-one. (62)**



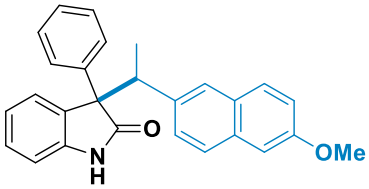

According to general procedure A, isolated yield 85% (31.9 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 7.82 (s, 1H), 7.62 – 7.56 (m, 2H), 7.32 – 7.24 (m, 4H), 7.14 – 6.96 (m, 9H), 6.91 (d, *J* = 7.5 Hz, 1H), 6.83 (d, *J* = 7.4 Hz, 2H), 6.79 (d, *J* = 7.7 Hz, 1H), 5.31 (s, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.19, 141.30, 140.06, 139.18, 138.91, 130.19, 130.05, 129.79, 128.52, 128.34, 128.13, 128.05, 127.91, 127.44, 127.41, 126.76, 126.57, 121.74, 110.03, 61.10, 58.97.

**HRMS** (ESI) calcd for $C_{27}H_{21}NO$ $(M+Na)^+$ 398.1515, found 398.1517.

**3-(1-(6-methoxynaphthalen-2-yl)ethyl)-3-phenylindolin-2-one. (63)**



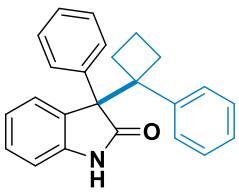

According to general procedure A, isolated yield 84% (33.0 mg, 0.1 mmol scale, dr = 1 : 1), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 8.12 (s, 0.5H), 7.69 – 7.64 (m, 1.5H), 7.65 - 7.58 (m, 1H), 7.53 – 7.43 (m, 1H), 7.42 – 7.26 (m, 5H), 7.26 – 7.16 (m, 2H), 7.08 – 6.87 (m, 3.5H), 6.85 – 6.78 (m, 1H), 6.59 – 6.55 (m, 0.5H), 4.26 – 4.07 (m, 1H), 3.90 – 3.85 (m, 3H), 1.45 (d, *J* = 7.2 Hz, 1.5H), 1.32 (d, *J* = 7.0 Hz, 1.5H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.83, 178.98, 157.47, 157.39, 141.53, 140.87, 138.63, 137.98, 135.68, 133.45, 133.35, 129.64, 129.43, 129.27, 128.57, 128.52, 128.40, 128.36, 128.29, 128.18, 128.04, 127.95, 127.91, 127.71, 127.42, 127.35, 127.23, 125.60, 125.23, 121.76, 121.48, 118.50, 118.37, 109.92, 109.64, 105.23, 105.22, 62.07, 61.34, 55.27, 55.23, 47.25, 47.01, 16.21, 15.54.

**HRMS** (ESI) calcd for $C_{27}H_{23}NO_2$ $(M+Na)^+$ 416.1621, found 416.1617.

**3-phenyl-3-(1-phenylcyclobutyl)indolin-2-one. (64)**




According to general procedure A, isolated yield 85% (28.8 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

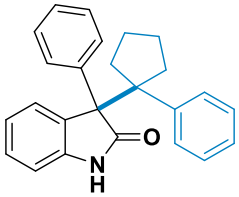
**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 8.04 (d, *J* = 7.4 Hz, 2H), 7.79 (s, 1H), 7.42 – 7.28 (m, 4H), 7.14 (t, *J* = 7.6 Hz, 1H), 7.08 – 6.98 (m, 6H), 6.64 (d, *J* = 7.7

Hz, 1H), 3.20 (dd, *J* = 19.3, 9.1 Hz, 1H), 2.82 (dd, *J* = 20.6, 8.9 Hz, 1H), 2.54 – 2.36 (m, 2H), 1.62 – 1.49 (m, 1H), 1.41 – 1.27 (m, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 178.86, 143.81, 140.44, 136.03, 130.34, 129.51, 129.15, 128.02, 127.91, 127.81, 127.32, 126.65, 125.91, 121.03, 109.39, 61.53, 53.33, 31.14, 30.56, 16.33.

**HRMS** (ESI) calcd for $C_{24}H_{21}NO$ $(M+Na)^+$ 362.1515, found 362.1510.

**3-phenyl-3-(1-phenylcyclopentyl)indolin-2-one. (65)**



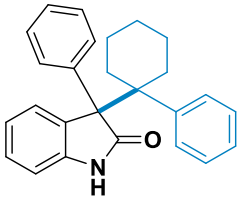
According to general procedure A, isolated yield 93% (32.8 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.29 (s, 1H), 7.99 – 7.91 (m, 2H), 7.35 – 7.27 (m, 3H), 7.16 (t, *J* = 7.6 Hz, 1H), 7.16– 6.90 (m, 7H), 6.72 (d, *J* = 7.7 Hz, 1H), 2.60 – 2.33 (m, 3H), 1.85 – 1.74 (m, 1H), 1.59 – 1.43 (m, 2H), 1.40 – 1.26 (m, 1H), 1.20 – 1.07 (m, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.43, 140.57, 140.50, 135.96, 131.19, 130.05, 128.84, 128.51, 127.78, 127.51, 127.21, 126.96, 126.27, 120.91, 109.46, 62.26, 58.06, 33.24, 32.08, 21.30.

**HRMS** (ESI) calcd for $C_{25}H_{23}NO$ $(M+Na)^+$ 376.1672, found 376.1677.

**3-phenyl-3-(1-phenylcyclohexyl)indolin-2-one. (66)**



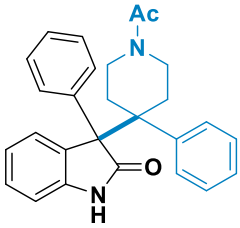
According to general procedure A, isolated yield 90% (33.0 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.18 (s, 1H), 7.92 – 7.82 (m, 2H), 7.31 – 7.21 (m, 4H), 7.20 – 7.01 (m, 4H), 6.92 (t, *J* = 7.6 Hz, 1H), 6.81 (d, *J* = 6.5 Hz, 1H), 6.73 (d, *J* = 7.7 Hz, 1H), 6.44 (s, 1H), 2.58 – 2.37 (m, 3H), 1.63 (dd, *J* = 13.6, 3.4 Hz, 1H), 1.54– 1.25 (m, 4H), 1.21 – 1.08 (m, 1H), 0.92 (q, *J* = 13.1 Hz, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 178.91, 140.99, 138.72, 134.63, 130.49, 130.09, 129.29, 127.75, 127.10, 127.03, 126.81, 126.24, 120.59, 109.06, 63.82, 50.16, 30.65, 30.21, 26.01, 22.26.

**HRMS** (ESI) calcd for $C_{26}H_{25}NO$ $(M+Na)^+$ 390.1828, found 390.1820.

**3-(1-acetyl-4-phenylpiperidin-4-yl)-3-phenylindolin-2-one. (67)**



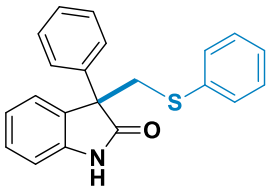

According to general procedure A, isolated yield 65% (26.7 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 3 : 1 : 4).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.41 (s, 1H), 7.95 – 7.78 (m, 2H), 7.33 – 7.26 (m, 3.5H), 7.23 – 6.87 (m, 6.5H), 6.80 – 6.65 (m, 2H), 4.49 – 4.38 (m, 1H), 3.64 – 3.54 (m, 1H), 3.12 – 3.02 (m, 0.5H), 2.83 (s, 1H), 2.76– 2.40 (m, 3H), 1.96 (d, *J* = 24.2 Hz, 3H),1.90 – 1.76 (m, 1.5H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 178.31, 178.22, 168.81, 168.75, 141.09, 140.97, 136.45, 136.39, 133.88, 133.82, 130.31, 130.29, 129.75, 129.55, 129.13, 129.03, 128.85, 128.24, 128.22, 127.61, 127.49, 127.45, 127.43, 127.39, 127.14, 126.97, 121.06, 120.82, 109.56, 109.54, 63.01, 62.72, 48.58, 48.51, 42.91, 37.98, 37.78, 30.83, 30.11, 29.95, 29.41, 21.36.

**HRMS** (ESI) calcd for $C_{27}H_{26}N_2O_2$ $(M+Na)^+$ 433.1886, found 433.1884.

**3-phenyl-3-((phenylthio)methyl)indolin-2-one. (68)**



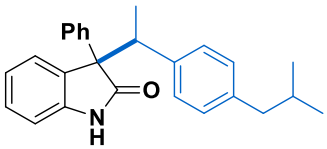

According to general procedure A, isolated yield 65% (21.5 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.36 (s, 1H), 7.43 – 7.38 (m, 2H), 7.34 – 7.26 (m, 4H), 7.26 – 7.20 (m, 3H), 7.19 – 7.09 (m, 3H), 7.00 (td, *J* = 7.6, 0.8 Hz, 1H), 6.96 (d, *J* = 7.8 Hz, 1H), 3.88 (q, *J* = 12.5 Hz, 2H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.15, 141.28, 138.57, 136.14, 134.33, 130.91, 130.83, 128.78, 128.75, 128.70, 127.85, 126.99, 126.69, 125.91, 122.60, 110.14, 57.37, 42.96.

**HRMS** (ESI) calcd for $C_{21}H_{17}NOS$ $(M+Na)^+$ 354.0923, found 354.0915.

**3-(1-(4-isobutylphenyl)ethyl)-3-phenylindolin-2-one. (69)**




According to general procedure A, isolated yield 96% ( 35.4 mg, 0.1 mmol scale, dr = 1 : 1), white solid, eluent (PE : EA : DCM = 10 : 1 :11).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 7.64 – 7.56 (m, 3H), 7.39 – 7.33 (m, 2H), 7.31 – 7.27 (m, 1H), 7.24 (dd, *J* = 7.7, 1.3 Hz, 1H), 7.17 (td, *J* = 7.6, 1.1 Hz, 1H), 7.12 – 7.06 (m, 1H), 6.79 – 6.72 (m, 4H),

6.62 (d, *J* = 7.7 Hz, 1H), 4.05 (q, *J* = 7.2 Hz, 1H), 2.30 (dd, *J* = 7.2, 3.0 Hz, 2H), 1.79 – 1.67 (m, 1H), 1.36 (d, *J* = 7.3 Hz, 3H), 0.80 (dd, *J* = 6.5, 5.3 Hz, 6H).

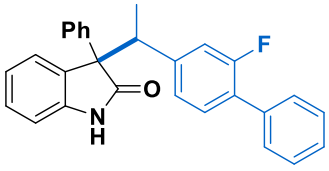
**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.00, 141.49, 140.03, 138.04, 137.46, 129.34, 128.51, 128.40, 128.39, 128.13, 127.94, 127.34, 127.28, 121.66, 109.64, 62.08, 46.89, 44.91, 30.09, 22.35, 22.22, 15.93.

**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 7.97 (s, 1H), 7.62 – 7.56 (m, 2H), 7.33 – 7.27 (m, 2H), 7.26 – 7.22 (m, 1H), 7.18 (td, *J* = 7.7, 1.1 Hz, 1H), 6.97 (td, *J* = 7.6, 0.8 Hz, 1H), 6.88 – 6.74 (m, 6H), 3.98 (d, *J* = 7.1 Hz, 1H), 2.35 (d, *J* = 7.2 Hz, 2H), 1.82 – 1.71 (m, 1H), 1.30 (d, *J* = 7.1 Hz, 3H), 0.83 (dd, *J* = 6.6, 2.8 Hz, 6H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.74, 140.71, 140.01, 138.74, 137.51, 129.97, 128.91, 128.27, 127.92, 127.89, 127.86, 127.22, 127.16, 121.50, 109.40, 61.38, 46.72, 44.92, 30.10, 22.32, 22.29, 15.39.

**HRMS** (ESI) calcd for $C_{26}H_{27}NO$ $(M+Na)^+$ 392.1985, found 392.1989.

**3-(1-(2-fluoro-[1,1'-biphenyl]-4-yl)ethyl)-3-phenylindolin-2-one. (70)**




According to general procedure A, isolated yield 94% ( 38.2 mg, 0.1 mmol scale, dr = 1 : 1), white solid, eluent (PE : EA : DCM = 10 : 1 : 11).

**$^{1}$H NMR** (400 MHz, DMSO) δ 10.22 (s, 1H), 7.65 (d, *J* = 7.3 Hz, 1H), 7.55 (d, *J* = 7.4 Hz, 2H), 7.46 – 7.42 (m, 4H), 7.41 – 7.34 (m, 3H), 7.33 – 7.23 (m, 2H), 7.24 (t, *J* = 8.3 Hz, 1H), 7.17 (td, *J* = 7.6, 0.8 Hz, 1H), 6.83 (dd, *J* = 8.0, 1.5 Hz, 1H), 6.74 (d, *J* = 7.6 Hz, 1H), 6.69 (dd, *J* = 12.8, 1.3 Hz, 1H), 4.08 (q, *J* = 7.1 Hz, 1H), 1.29 (d, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (101 MHz, DMSO) δ 178.40, 158.53 (d, *J* = 245.8 Hz), 143.73 (d, *J* = 7.6 Hz), 143.05, 138.88, 135.22 (d, *J* = 1.0 Hz), 129.80 (d, *J* = 3.7 Hz), 129.30, 129.17, 129.06, 129.03, 128.98, 128.88, 128.17, 128.00, 127.65, 127.38, 126.60 (d, *J* = 13.1 Hz), 125.77 (d, *J* = 2.7 Hz), 121.78, 116.53 (d, *J* = 23.2 Hz), 110.22, 61.41, 46.03, 16.64.

**$^{19}$F NMR** (376 MHz, DMSO) δ -119.42.

**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 8.43 (s, 1H), 7.67 – 7.60 (m, 2H), 7.54 – 7.47 (m, 2H), 7.44 – 7.37 (m, 2H), 7.36 – 7.31 (m, 3H), 7.30 – 7.27 (m, 1H), 7.25 – 7.21 (m, 1H), 7.14 (t, *J* = 8.3 Hz, 1H),

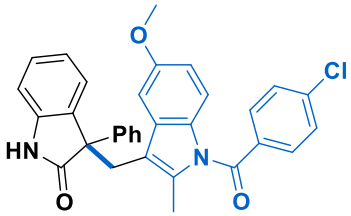
7.03 (td, *J* = 7.6, 0.9 Hz, 1H), 6.96 (d, *J* = 7.4 Hz, 1H), 6.89 (d, *J* = 7.7 Hz, 1H), 6.75 – 6.68 (m, 2H), 4.05 (q, *J* = 7.0 Hz, 1H), 1.32 (d, *J* = 7.0 Hz, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.80, 158.78 (d, *J* = 248.1 Hz), 157.55, 142.25 (d, *J* = 7.5 Hz), 140.91, 138.28, 135.53 (d, *J* = 1.3 Hz), 129.35, 129.14 (d, *J* = 3.9 Hz), 128.91, 128.88, 128.47, 128.39, 128.30, 127.84, 127.55, 127.49, 127.10, 127.06 (d, *J* = 13.3 Hz), 125.38 (d, *J* = 3.2 Hz), 121.76, 116.94 (d, *J* = 23.7 Hz), 109.89, 61.13, 46.51, 15.47.

**$^{19}$F NMR** (376 MHz, $CDCl_3$) δ -118.88.

**HRMS** (ESI) calcd for $C_{28}H_{22}FNO$ $(M+Na)^+$ 430.1578, found 430.1574.

**3-((1-(4-chlorobenzoyl)-5-methoxy-2-methyl-1H-indol-3-yl)methyl)-3-phenylindolin-2-one. (71)**



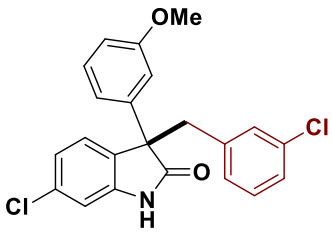

According to general procedure A, isolated yield 47% (24.4 mg, 0.1 mmol scale, dr = 1 : 1), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 8.00 (s, 1H), 7.58 (d, *J* = 7.4 Hz, 2H), 7.42 – 7.28 (m, 7H), 7.23 (m, 1H), 7.17 (d, *J* = 7.4 Hz, 1H), 7.13 (d, *J* = 9.0 Hz, 1H), 7.02 (t, *J* = 7.5 Hz, 1H), 6.81 (m, 2H), 6.61 (dd, *J* = 9.0, 2.5 Hz, 1H), 3.83 (d, *J* = 14.1 Hz, 1H), 3.67 (s, 3H), 3.59 (d, *J* = 14.1 Hz, 1H), 1.79 (s, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 180.43, 168.12, 155.75, 141.13, 139.77, 139.01, 135.77, 134.31, 133.99, 132.04, 131.14, 130.72, 128.95, 128.72, 128.30, 127.65, 127.31, 126.62, 123.58, 122.02, 114.67, 114.45, 112.32, 109.80, 101.74, 57.47, 55.59, 33.76, 14.72.

**HRMS** (ESI) calcd for $C_{32}H_{25}ClN_2O_3$ $(M+Na)^+$ 543.1446, found 543.1438.

**6-chloro-3-(2-(3-chlorophenyl)propan-2-yl)-3-(3-methoxyphenyl)indolin-2-one. (72)**




According to general procedure A, isolated yield 77% ( 30.6 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

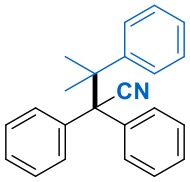
**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 8.32 (s, 1H), 7.31 – 7.24 (m, 1H), 7.10 – 6.94 (m, 6H), 6.89 (s, 1H), 6.85 (dd, *J* = 8.2, 2.2 Hz, 1H), 6.79 –

6.75 (m, 2H), 3.79 (s, 3H), 3.63 (d, *J* = 13.0 Hz, 1H), 3.41 (d, *J* = 13.0 Hz, 1H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 179.60, 159.83, 141.85, 140.35, 137.33, 134.12, 133.57, 130.18, 129.79, 129.76, 129.06, 128.26, 127.10, 126.66, 122.40, 119.33, 113.62, 112.62, 110.70, 58.04, 55.30, 42.91.

**HRMS** (ESI) calcd for $C_{22}H_{17}Cl_2NO_2$ $(M+Na)^+$ 420.0529, found 420.0530.

**3-methyl-2,2,3-triphenylbutanenitrile. (73)**



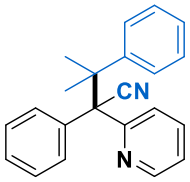

According to general procedure C, isolated yield 90% ( 28.0 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 20 : 1).

**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 7.43 – 7.38 (m, 4H), 7.30 – 7.25 (m, 4H), 7.26 – 7.19 (m, 2H), 7.18 – 7.12 (m, 2H), 6.94 – 6.87 (m, 2H), 1.69 (s, 6H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 143.84, 137.51, 129.61, 128.86, 127.84, 127.79, 127.29, 126.88, 123.40, 62.20, 46.24, 28.41.

**HRMS** (ESI) calcd for $C_{23}H_{22}N$ $(M+H)^+$ 312.1747, found 312.1753.

**3-methyl-2,3-diphenyl-2-(pyridin-2-yl)butanenitrile. (74)**



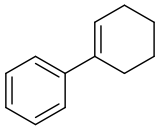

According to general procedure A, isolated yield 87% ( 27.1 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 15 : 1 : 10).

**$^{1}$H NMR** (400 MHz, $CDCl_3$) δ 8.68 (ddd, *J* = 4.7, 1.8, 0.9 Hz, 1H), 7.79 – 7.72 (m, 2H), 7.59 (dd, *J* = 7.2, 0.9 Hz, 1H), 7.56 – 7.50 (m, 1H), 7.32 – 7.27 (m, 3H), 7.21 – 7.12 (m, 6H), 1.75 (d, *J* = 3.9 Hz, 6H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 157.37, 147.87, 144.25, 136.60, 135.98, 130.00, 128.55, 127.85, 127.44, 126.98, 126.65, 124.39, 122.57, 122.41, 62.92, 46.98, 26.65, 26.13.

**HRMS** (ESI) calcd for $C_{22}H_{20}N_2$ $(M+H)^+$ 313.1699, found 313.1702.

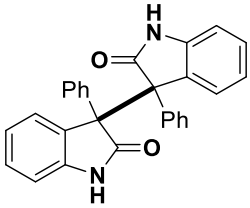
**2,3,4,5-tetrahydro-1,1'-biphenyl. (76)**



Isolated yield 75%, white solid, eluent (PE)

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 7.38 (d, *J* = 7.4 Hz, 2H), 7.30 (t, *J* = 7.6 Hz, 2H), 7.20 (t, *J* = 7.2 Hz, 1H), 6.15 – 6.09 (m, 1H), 2.45 – 2.37 (m, 2H), 2.21 (dt, *J* = 6.2, 3.7 Hz, 2H), 1.79 (dq, *J* = 6.1, 3.4 Hz, 2H), 1.71 – 1.62 (m, 2H).

**3,3'-diphenyl-[3,3'-biindoline]-2,2'-dione. (77)**

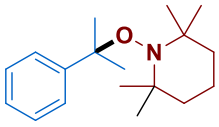



Isolated yield 90% (37.4 mg, 0.1 mmol scale), white solid, eluent (PE : EA = 2 : 1). The compound data was in agreement with the literature (Ref. *Macromol. Rapid Commun.* 2020, **41**, 1900460)

**$^1$H NMR** (400 MHz, DMSO) δ 10.44 (s, 2H), 7.39 – 7.29 (m, 6H), 7.26 - 7.20 (m, 7H), 6.81 (d, *J* = 7.6 Hz, 4H), 6.21 (s, 2H).

**HRMS** (ESI) calcd for $C_{28}H_{20}N_2O_2$ $(M+Na)^+$ 439.1417, found 439.1412.

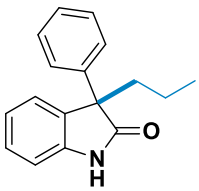
**2,2,6,6-tetramethyl-1-((2-phenylpropan-2-yl)oxy)piperidine. (78)**




Isolated yield 74%, white solid, eluent (PE : EA = 15 : 1). The compound data was in agreement with the literature (Ref. *Org. Lett.* 2018, **20**, 4824).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 7.51 – 7.46 (m, 2H), 7.33 – 7.27 (m, 2H), 7.23 – 7.16 (m, 1H), 1.61 (s, 6H), 1.55 – 1.49 (m, 1H), 1.45 – 1.39 (m, 3.5H), 1.30 – 1.23 (m, 1.5H), 1.10 (s, 6H), 0.85 (s, 6H).

**3-phenyl-3-propylindolin-2-one. (79)**



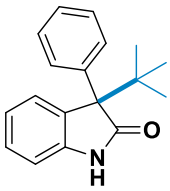

According to general procedure A, isolated yield 8% (2.0 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

**$^1$H NMR** (400 MHz, $CDCl_3$) δ 8.72 (s, 1H), 7.41 – 7.34 (m, 2H), 7.33 – 7.27 (m, 2H), 7.27 – 7.21 (m, 2H), 7.20 – 7.14 (m, 1H), 7.07 (td, *J* = 7.5, 1.0 Hz, 1H), 6.95 (d, *J* = 7.7 Hz, 1H), 2.38 (ddd, *J* = 13.0, 12.1, 4.5 Hz, 1H), 2.17 (td, *J* = 12.8, 4.1 Hz, 1H), 1.34 – 1.16 (m, 1H), 1.06 – 0.92 (m, 1H), 0.87 (t, *J* = 7.2 Hz, 3H).

**$^{13}$C NMR** (101 MHz, $CDCl_3$) δ 181.27, 141.12, 140.25, 133.20, 128.57, 128.03, 127.29, 126.88, 124.99, 122.57, 110.06, 57.35, 39.76, 17.89, 14.25.

**HRMS** (ESI) calcd for $C_{17}H_{17}NO$ $(M+Na)^+$ 274.1202, found 274.1210.

**3-(tert-butyl)-3-phenylindolin-2-one. (80)**



According to general procedure A, isolated yield 21% (5.6 mg, 0.1 mmol scale), white solid, eluent (PE : EA : DCM = 5 : 1 : 6).

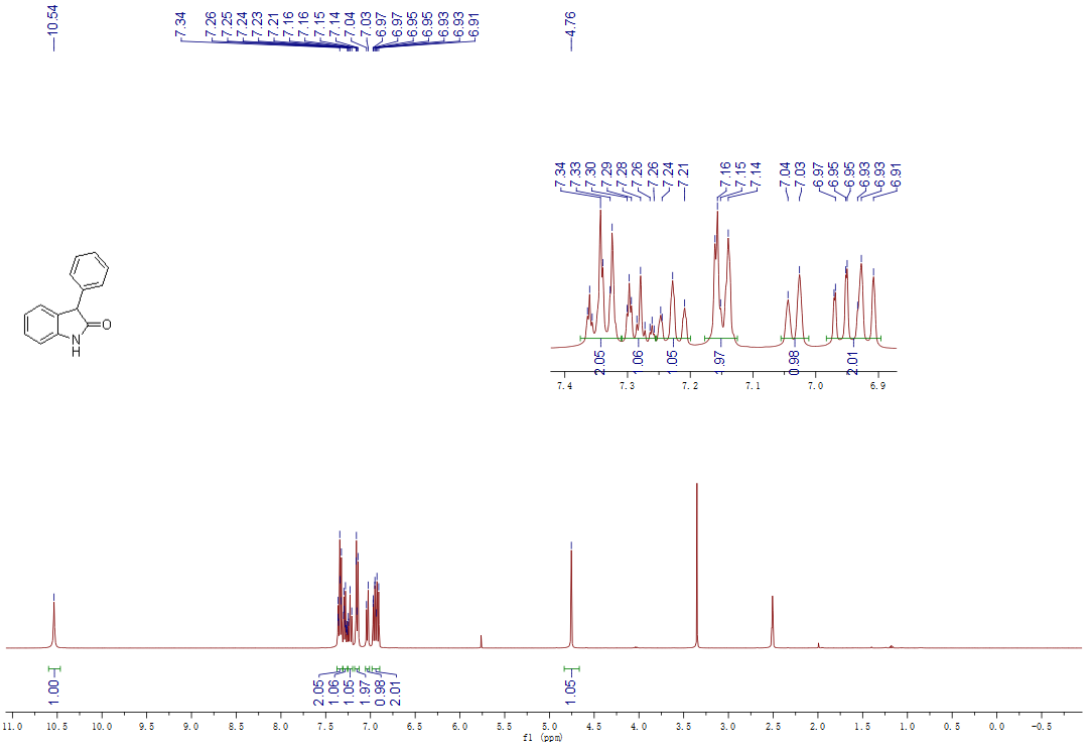
**$^1$H NMR** (600 MHz, $CDCl_3$) δ 8.60 (s, 1H), 8.01 (d, *J* = 7.9 Hz, 2H), 7.83 (d, *J* = 7.7 Hz, 1H), 7.34 (t, *J* = 7.7 Hz, 2H), 7.30 – 7.27 (m, 2H), 7.14 (t, *J* = 7.6 Hz, 1H), 6.94 (d, *J* = 7.7 Hz, 1H), 1.12 (s, 9H).

**$^{13}$C NMR** (151 MHz, $CDCl_3$) δ 179.47, 141.16, 135.70, 131.54, 129.39, 128.33, 127.82, 127.48, 126.85, 121.38, 109.65, 62.35, 38.48, 26.32.

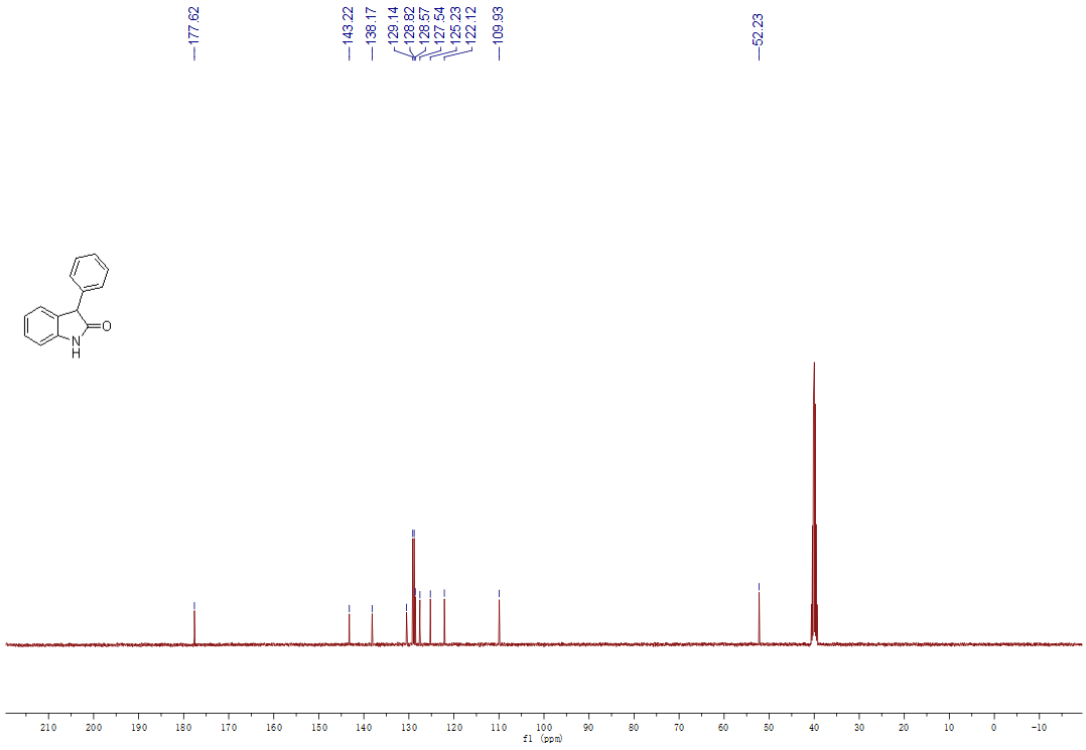
**HRMS** (ESI) calcd for $C_{18}H_{19}NO$ $(M+Na)^+$ 288.1359, found 288.1357.

## 13 NMR Spectra

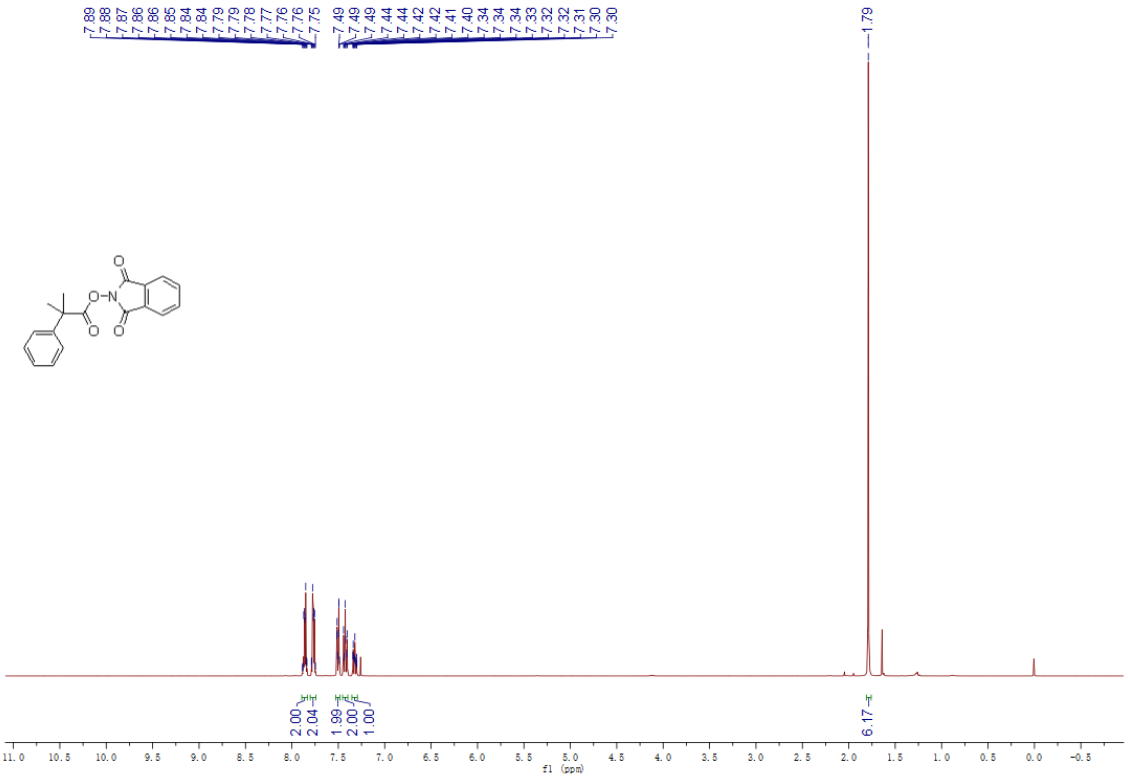
### $^{1}$H NMR spectrum of 3-phenylindolin-2-one (1):



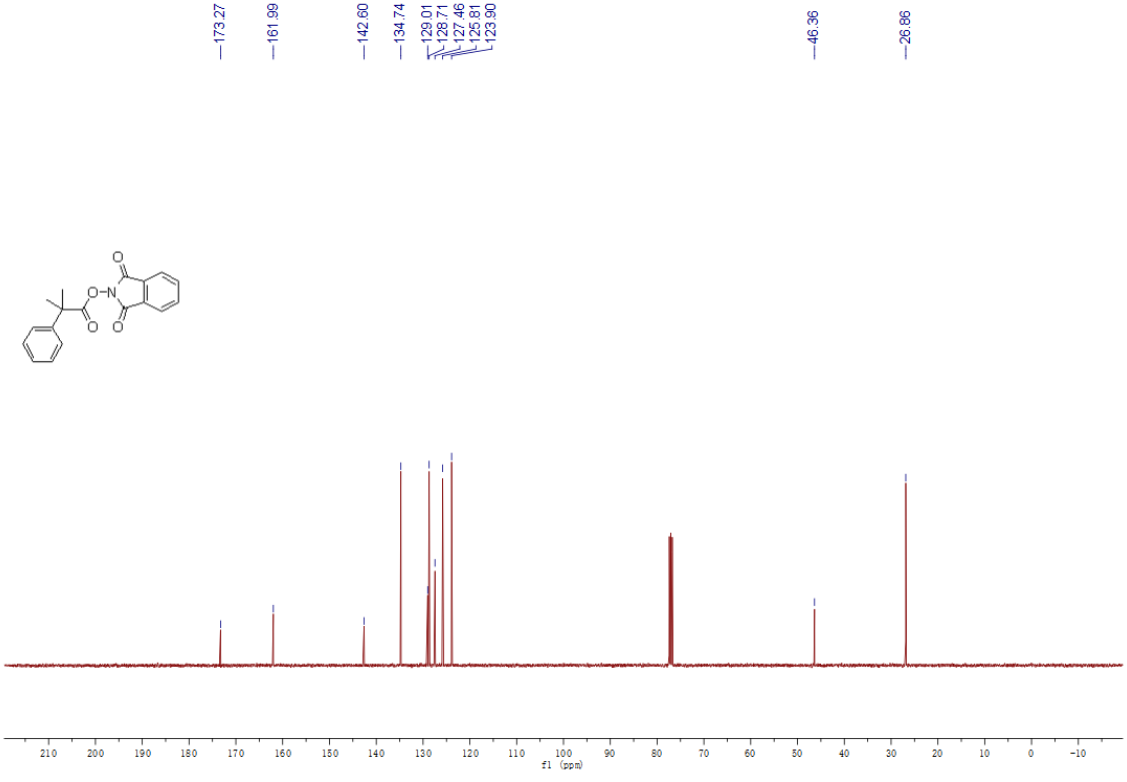

### $^{13}$C NMR spectrum of 3-phenylindolin-2-one (1):



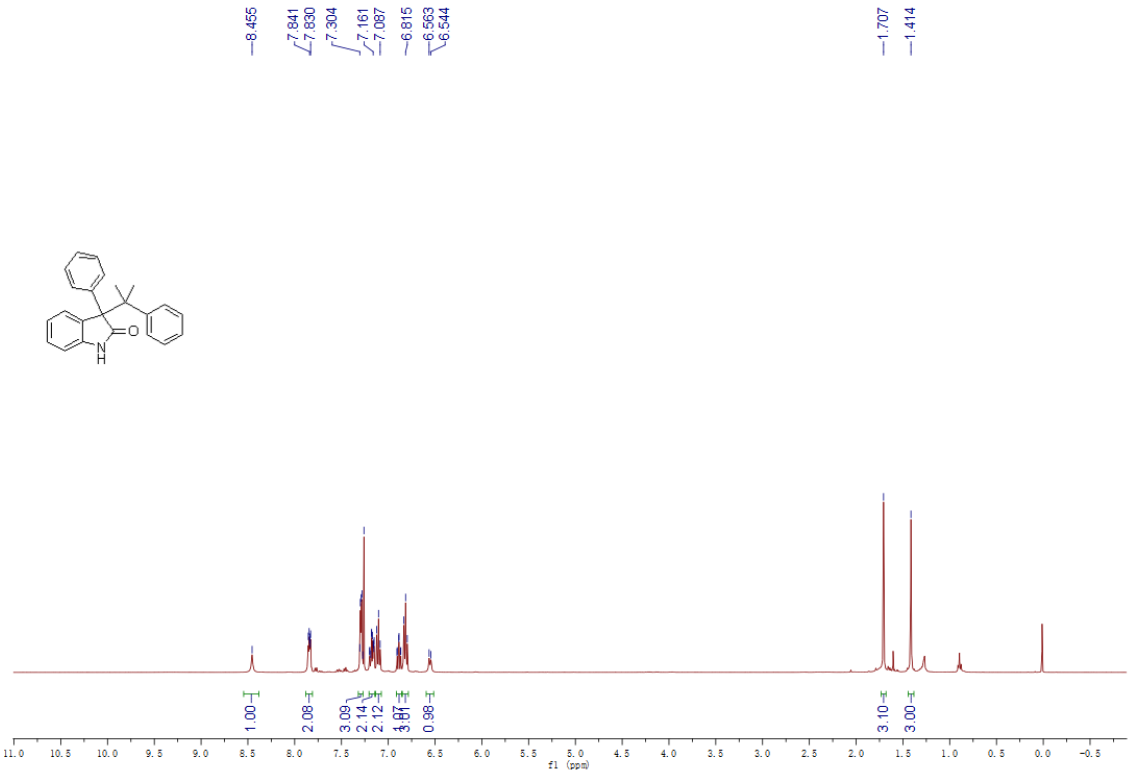
**$^{1}$H NMR spectrum of 1,3-dioxoisoindolin-2-yl 2-methyl-2-phenylpropanoate (2):**



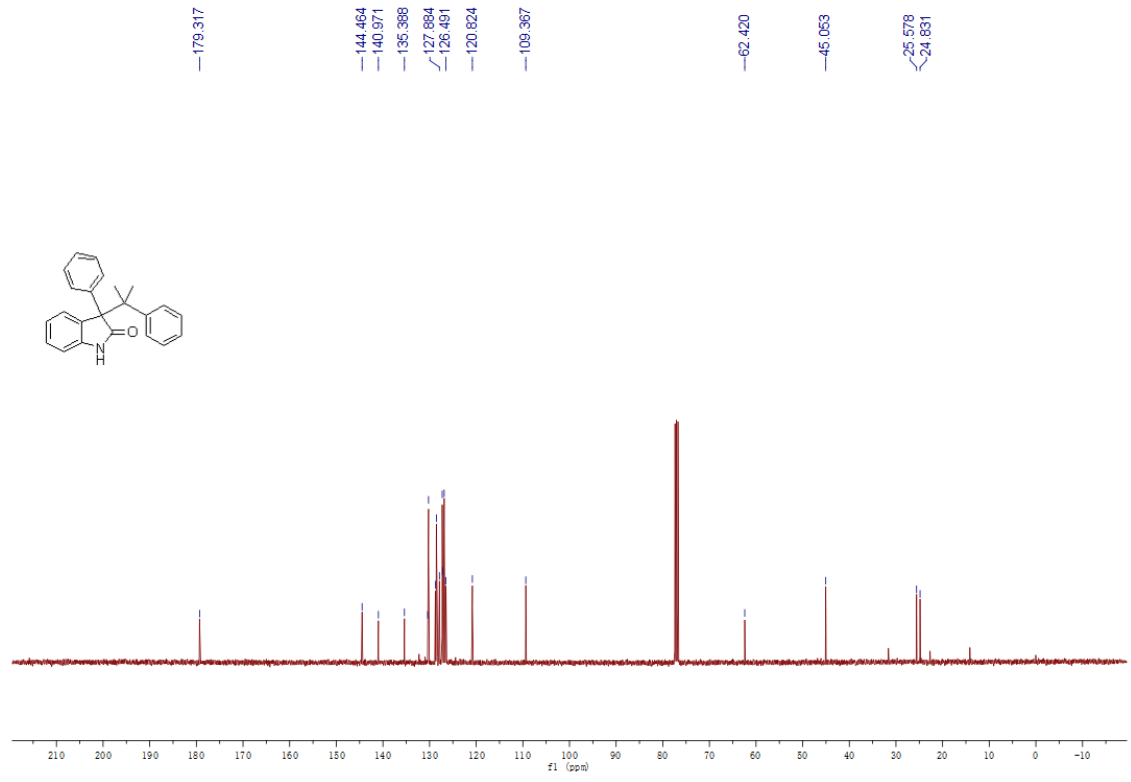

**$^{13}$C NMR spectrum of 1,3-dioxoisoindolin-2-yl 2-methyl-2-phenylpropanoate (2):**



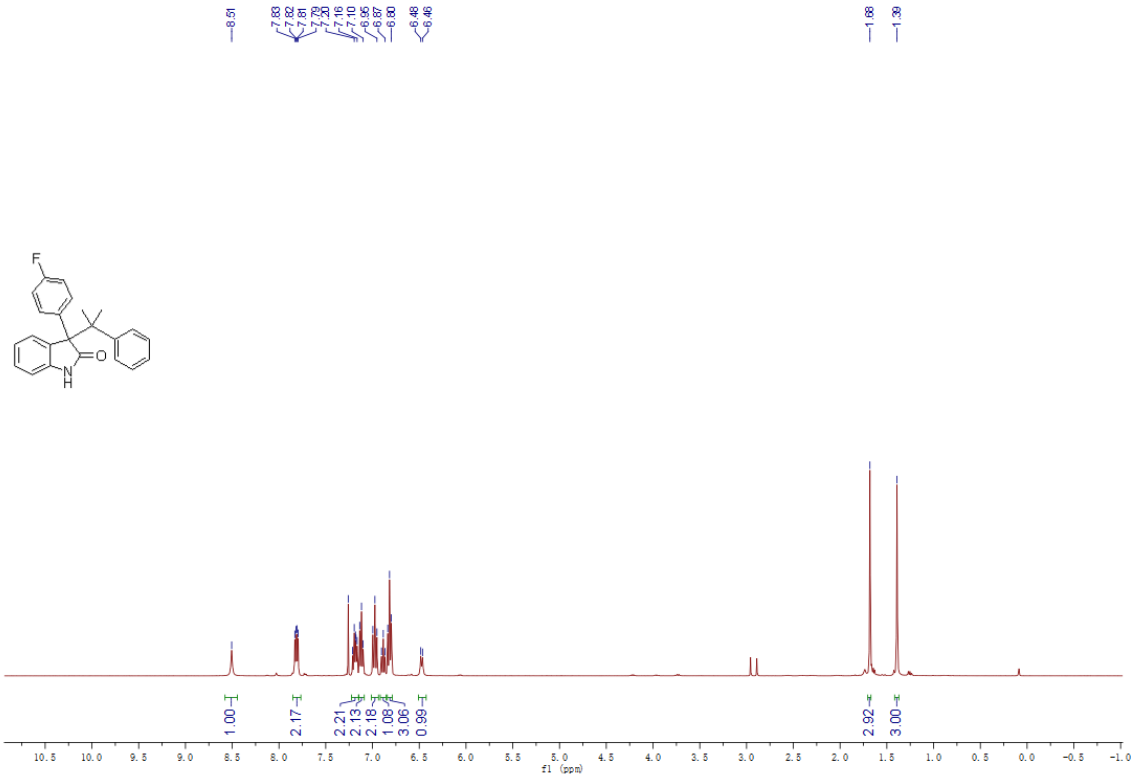
**$^{1}$H NMR spectrum of 3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (3):**



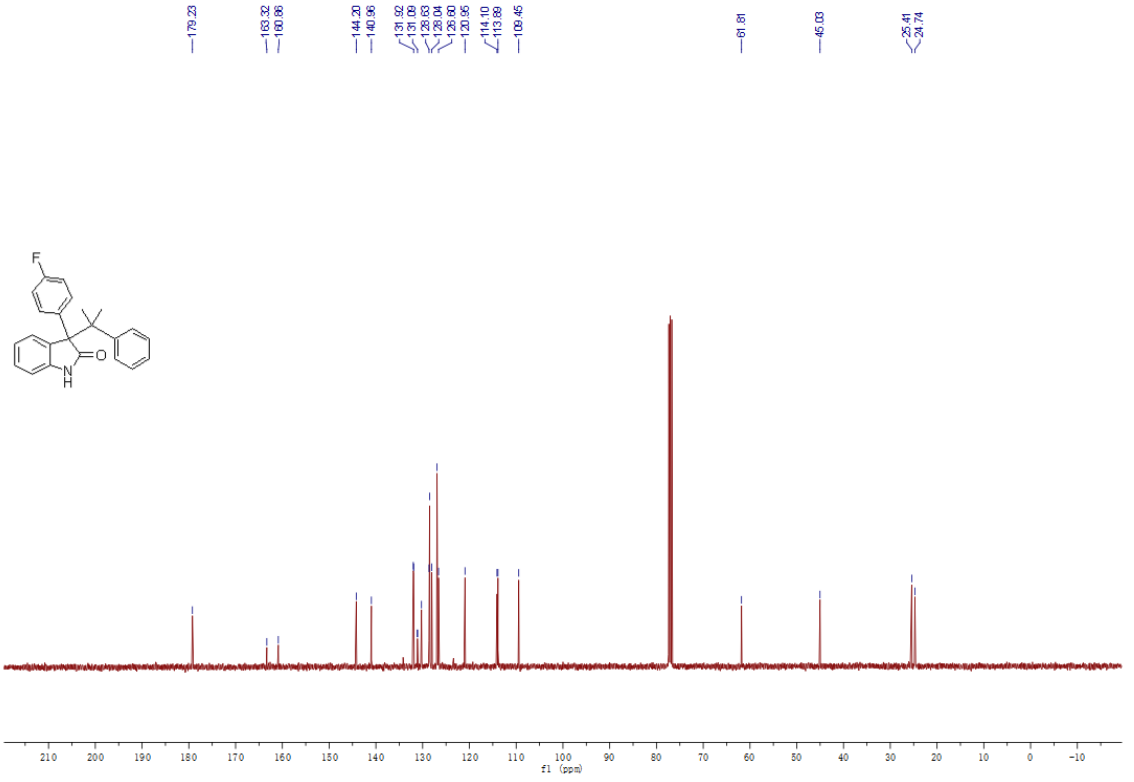

**$^{13}$C NMR spectrum of 3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (3):**



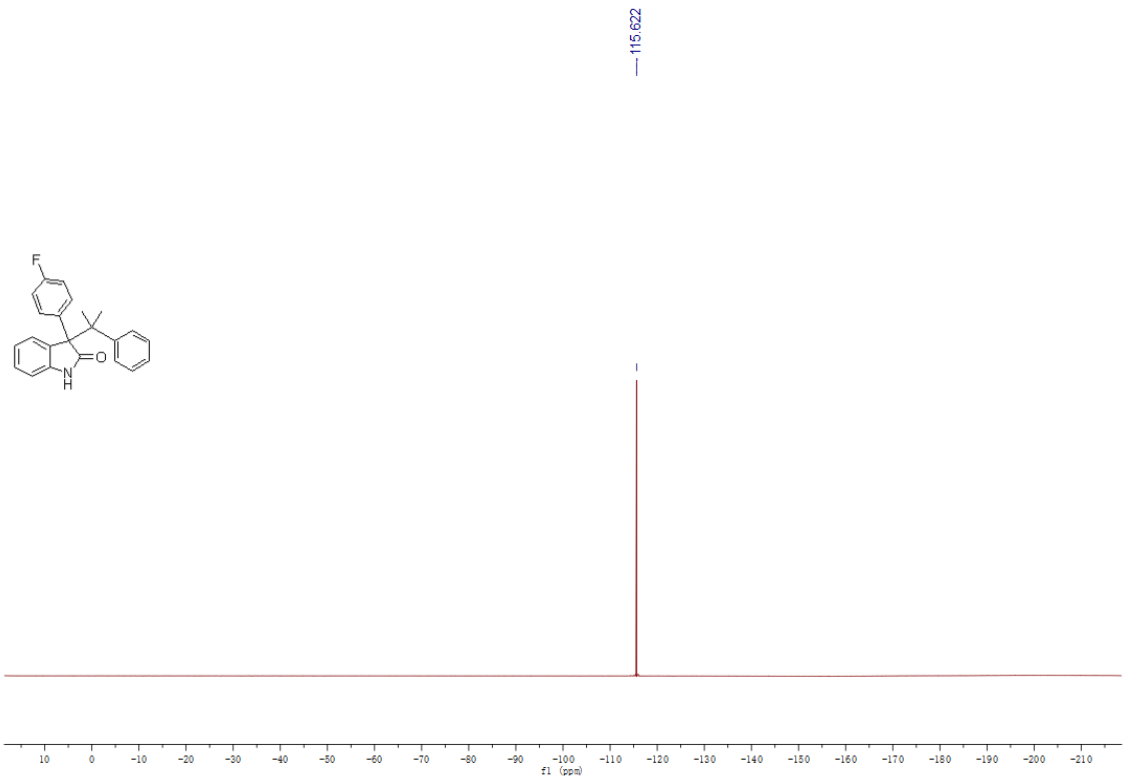
**$^{1}$H NMR spectrum of 3-(4-fluorophenyl)-3-(2-phenylpropan-2-yl)indolin-2-one (4):**



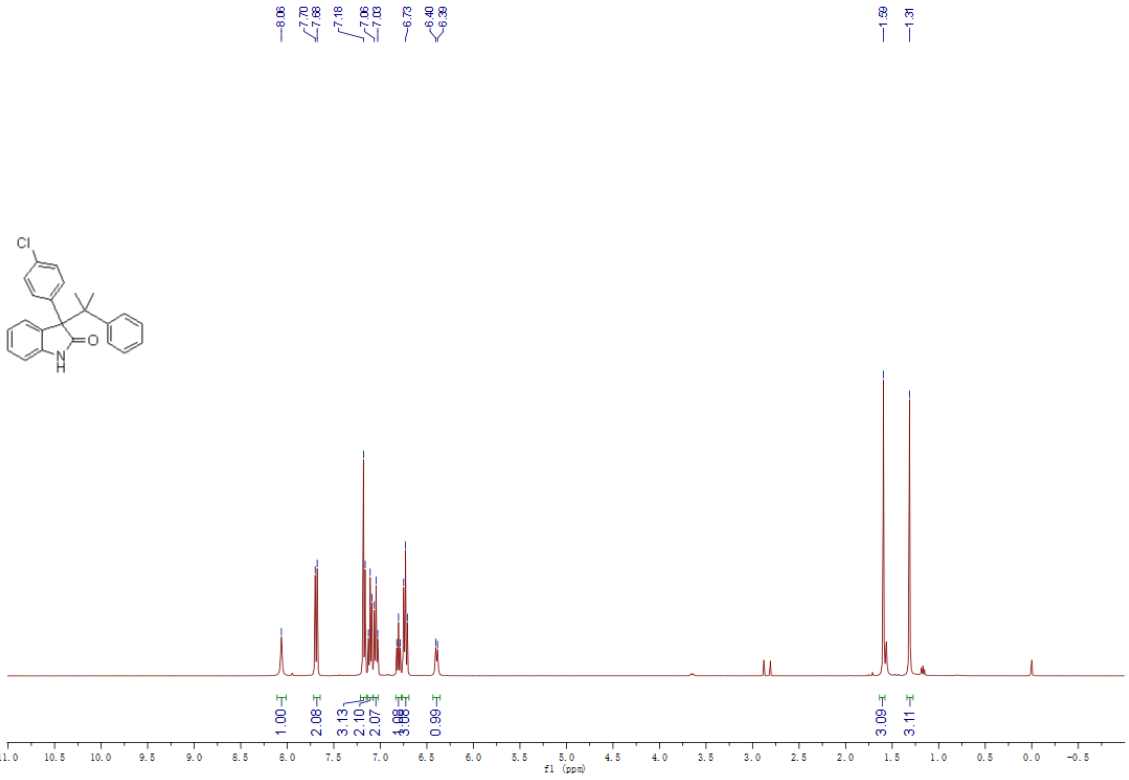

**$^{13}$C NMR spectrum of 3-(4-fluorophenyl)-3-(2-phenylpropan-2-yl)indolin-2-one (4):**



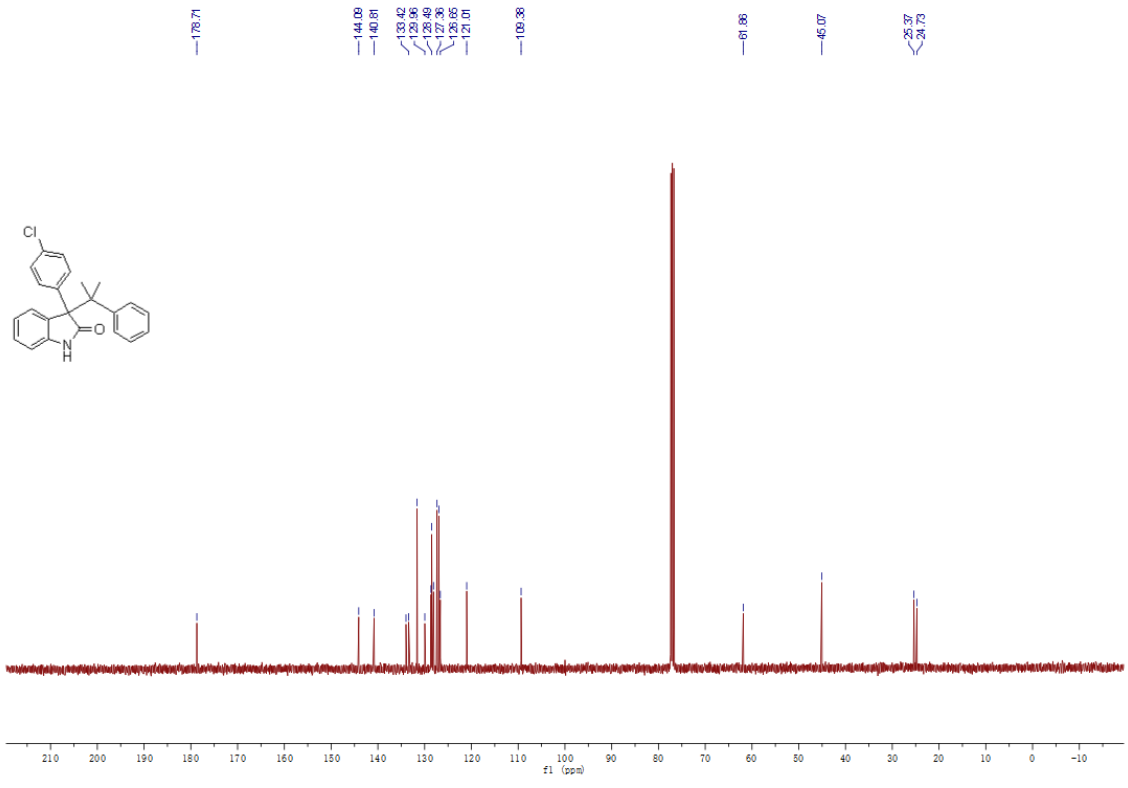
**$^{19}$F NMR spectrum of 3-(4-fluorophenyl)-3-(2-phenylpropan-2-yl)indolin-2-one (4):**



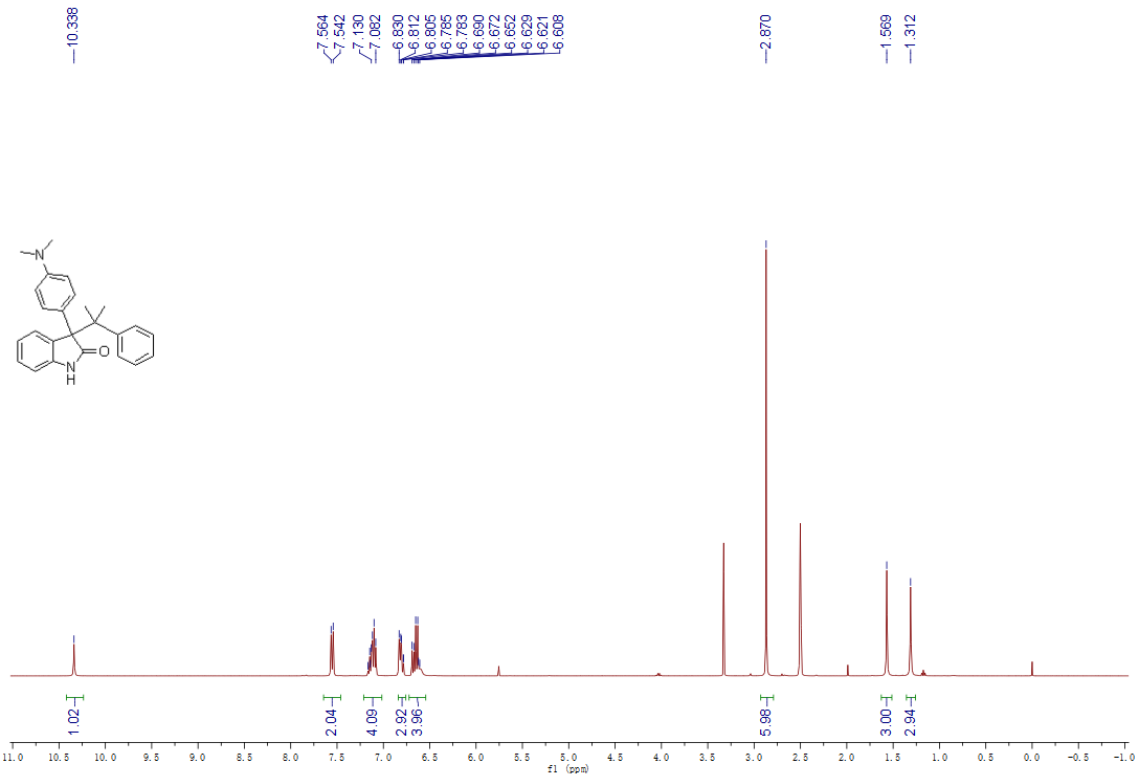
**$^{1}$H NMR spectrum of 3-(4-chlorophenyl)-3-(2-phenylpropan-2-yl)indolin-2-one (5):**



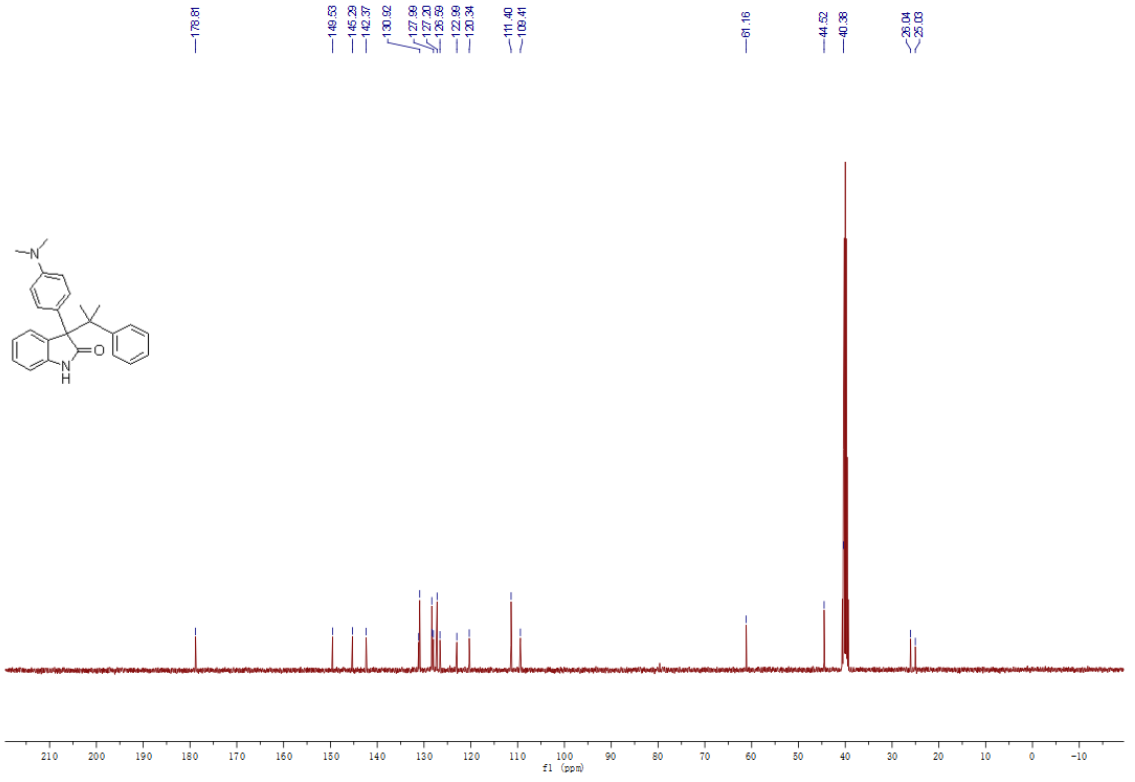

**$^{13}$C NMR spectrum of 3-(4-chlorophenyl)-3-(2-phenylpropan-2-yl)indolin-2-one (5):**



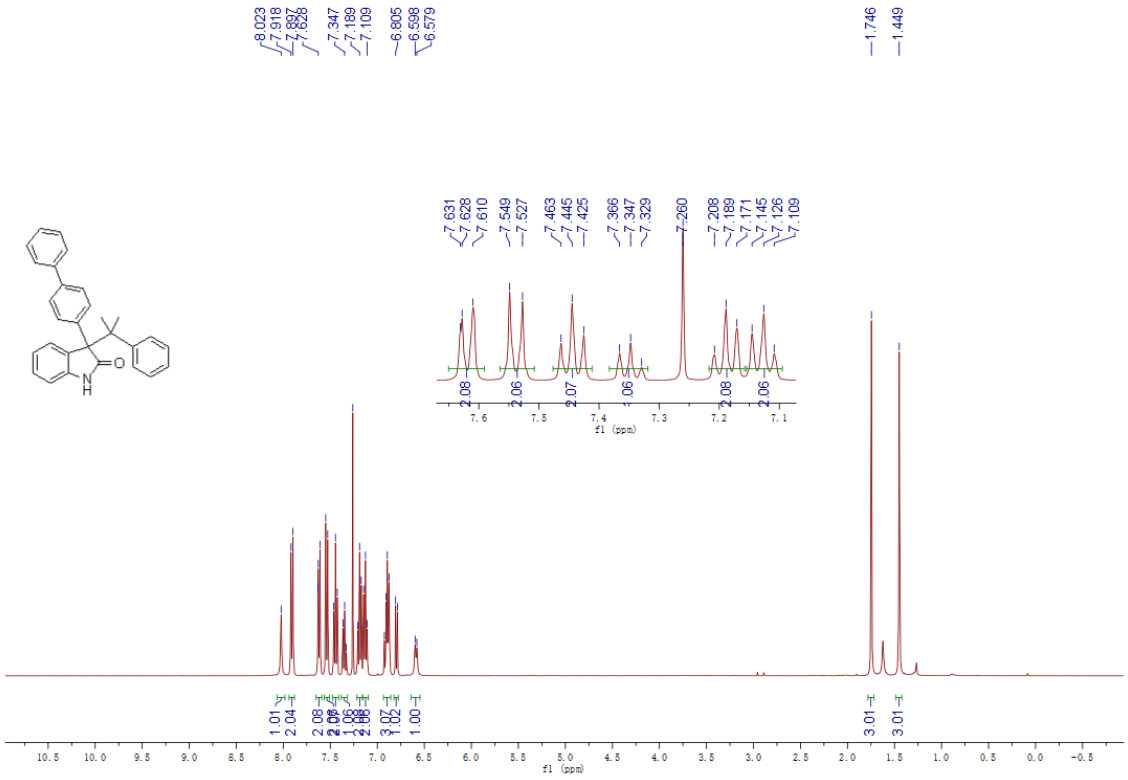
**$^{1}$H NMR spectrum of 3-(4-(dimethylamino)phenyl)-3-(2-phenylpropan-2-yl)indolin-2-one (6):**



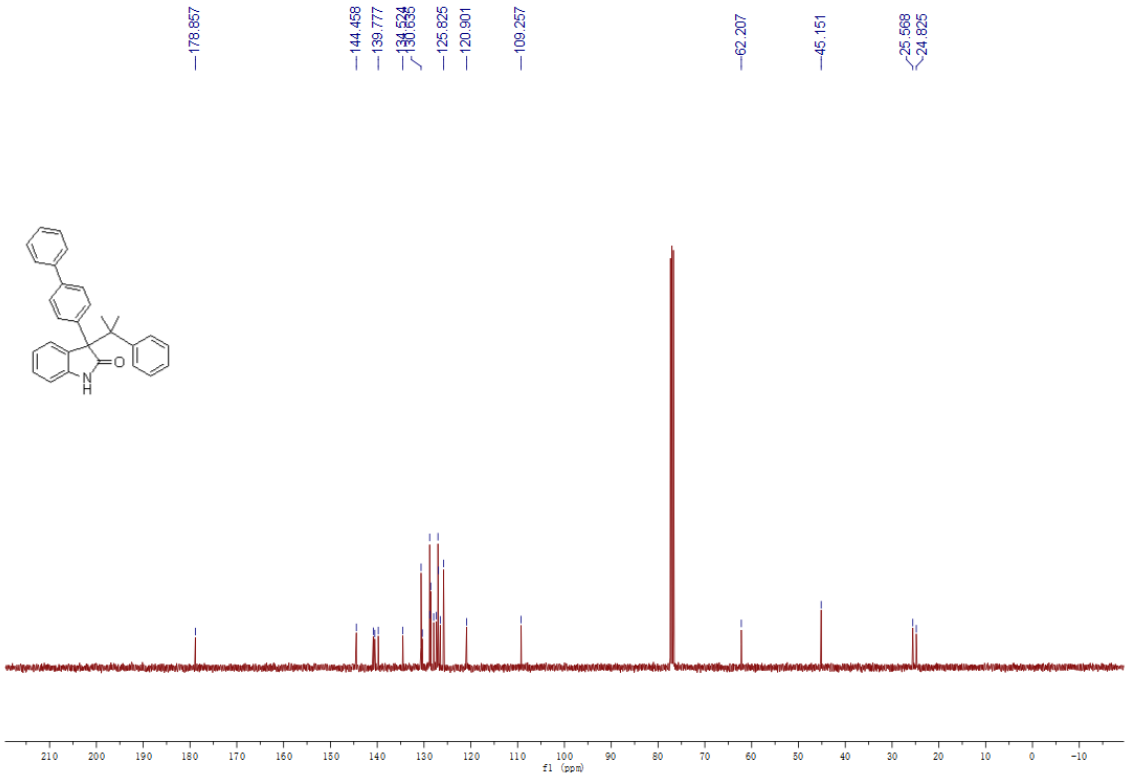

**$^{13}$C NMR spectrum of 3-(4-(dimethylamino)phenyl)-3-(2-phenylpropan-2-yl)indolin-2-one (6):**



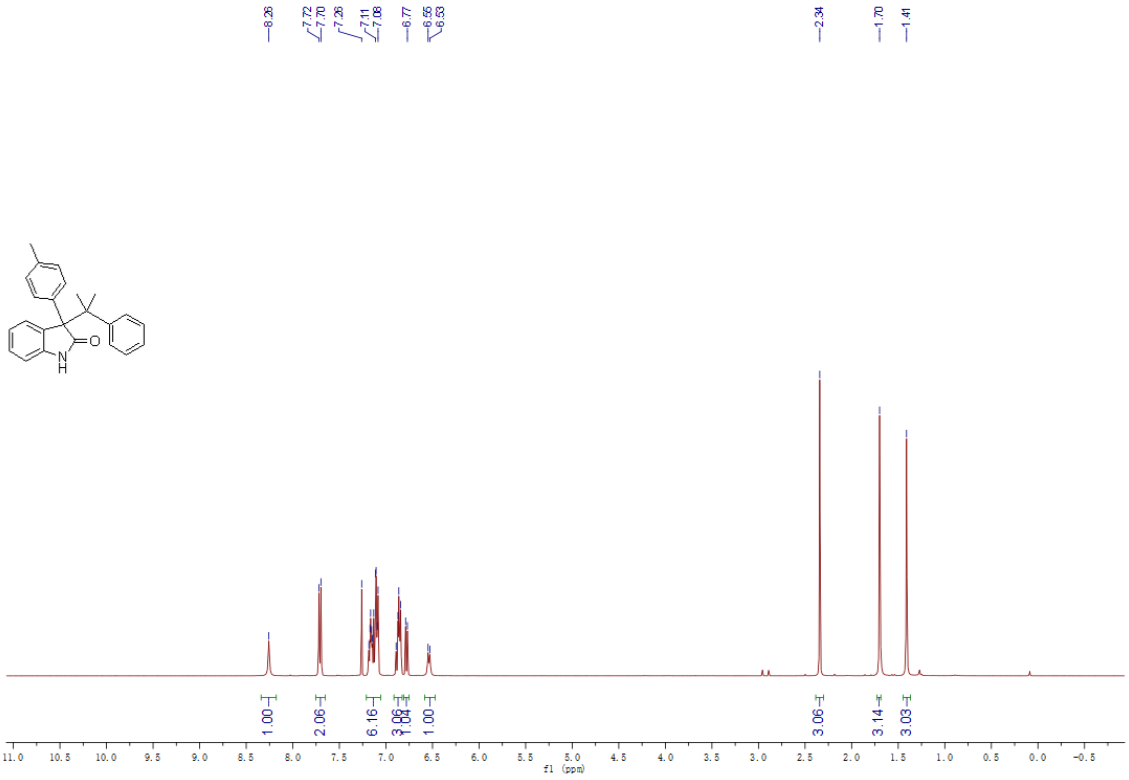
**$^{1}$H NMR spectrum of 3-([1,1'-biphenyl]-4-yl)-3-(2-phenylpropan-2-yl)indolin-2-one (7):**



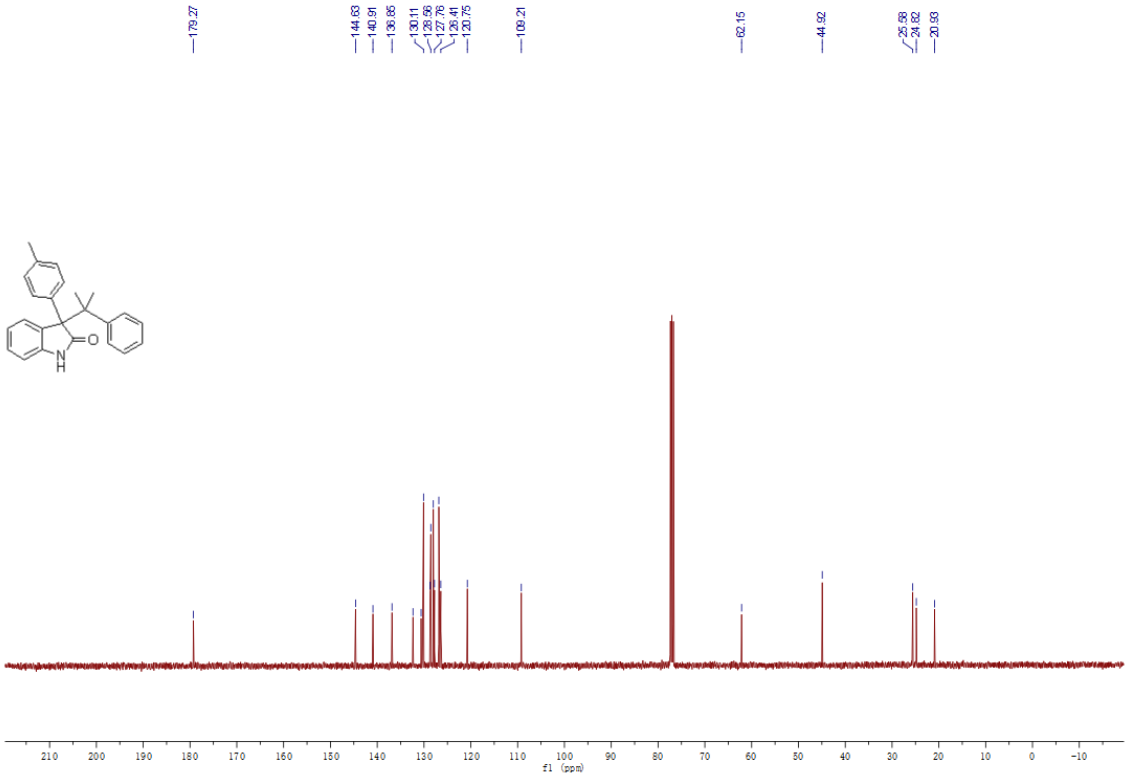
**$^{13}$C NMR spectrum of 3-([1,1'-biphenyl]-4-yl)-3-(2-phenylpropan-2-yl)indolin-2-one (7):**



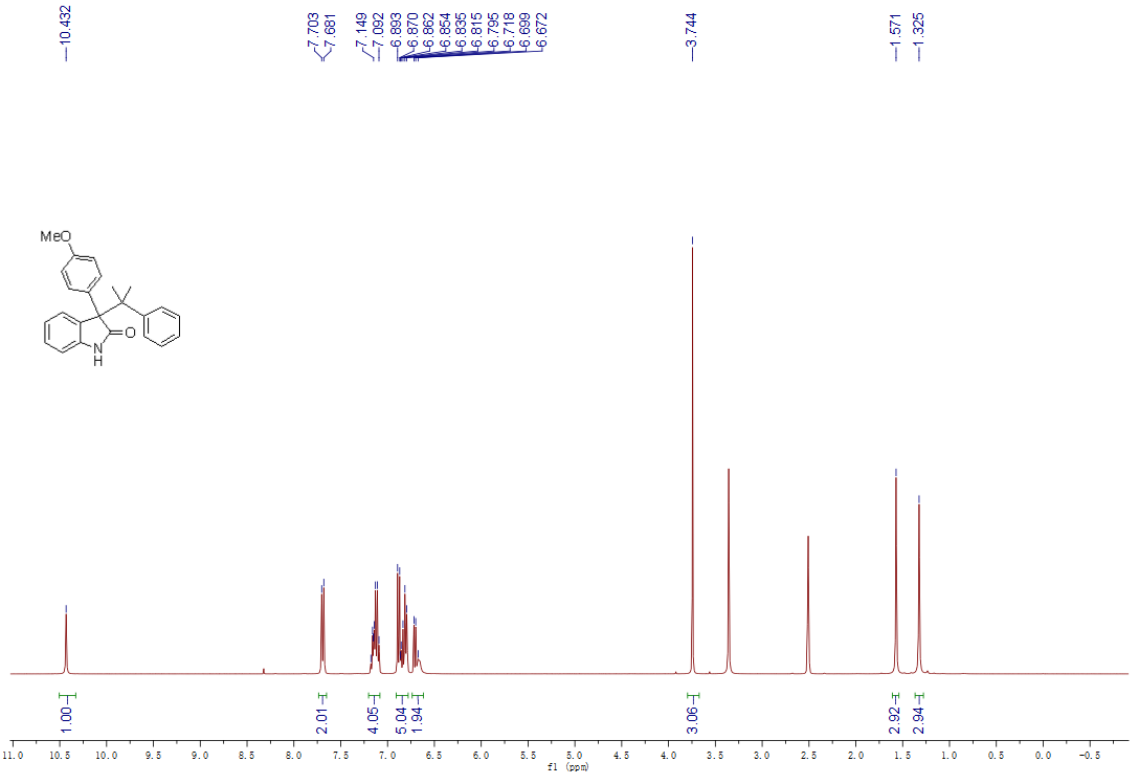
**$^{1}$H NMR spectrum of 3-(2-phenylpropan-2-yl)-3-(p-tolyl)indolin-2-one (8):**



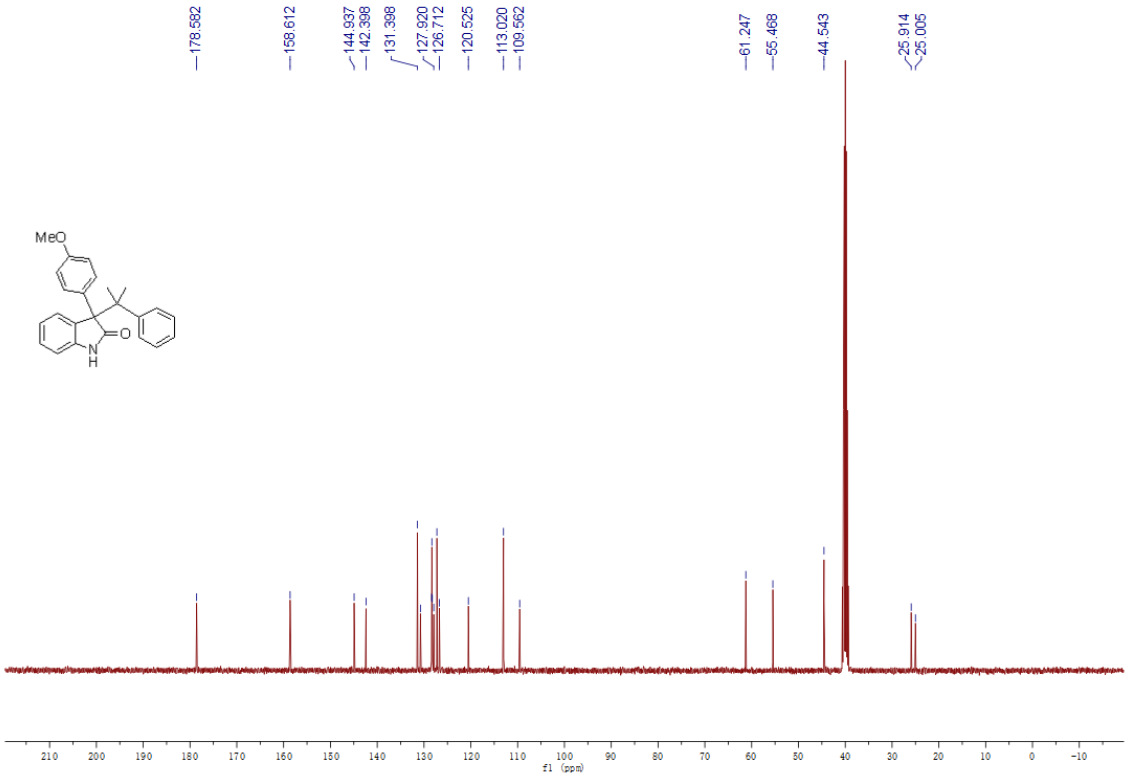

**$^{13}$C NMR spectrum of 3-(2-phenylpropan-2-yl)-3-(p-tolyl)indolin-2-one (8):**



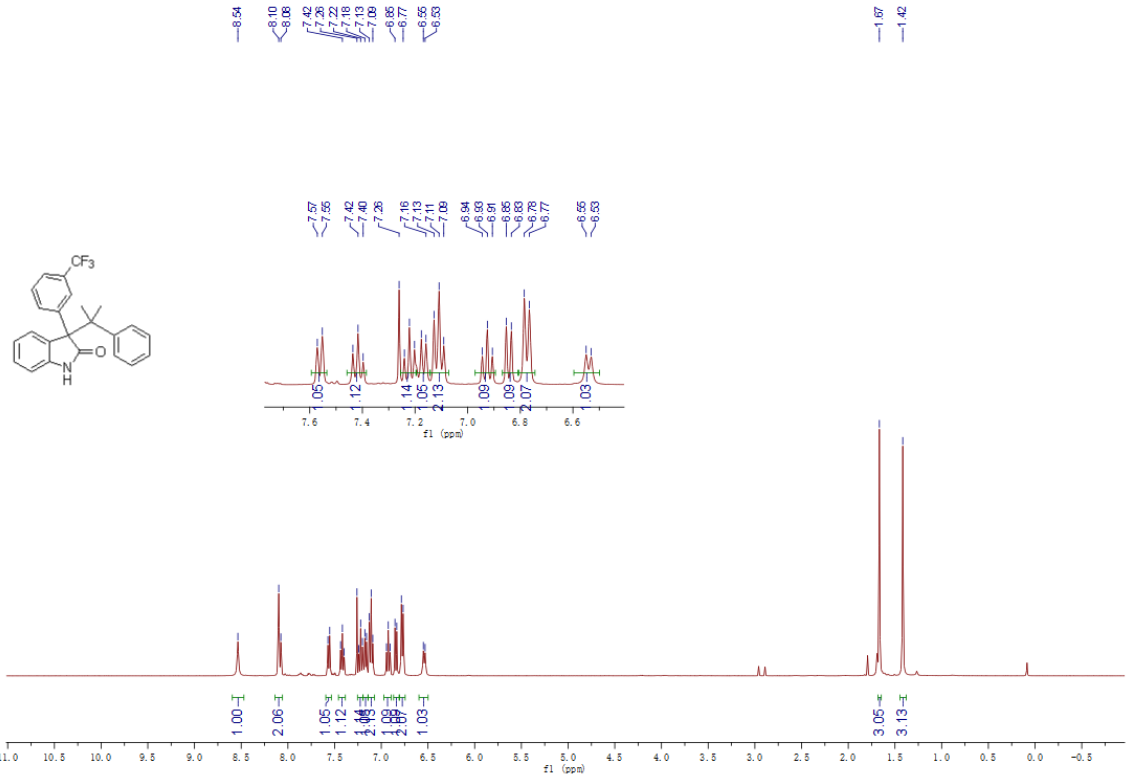
**$^{1}$H NMR spectrum of 3-(4-methoxyphenyl)-3-(2-phenylpropan-2-yl)indolin-2-one (9):**



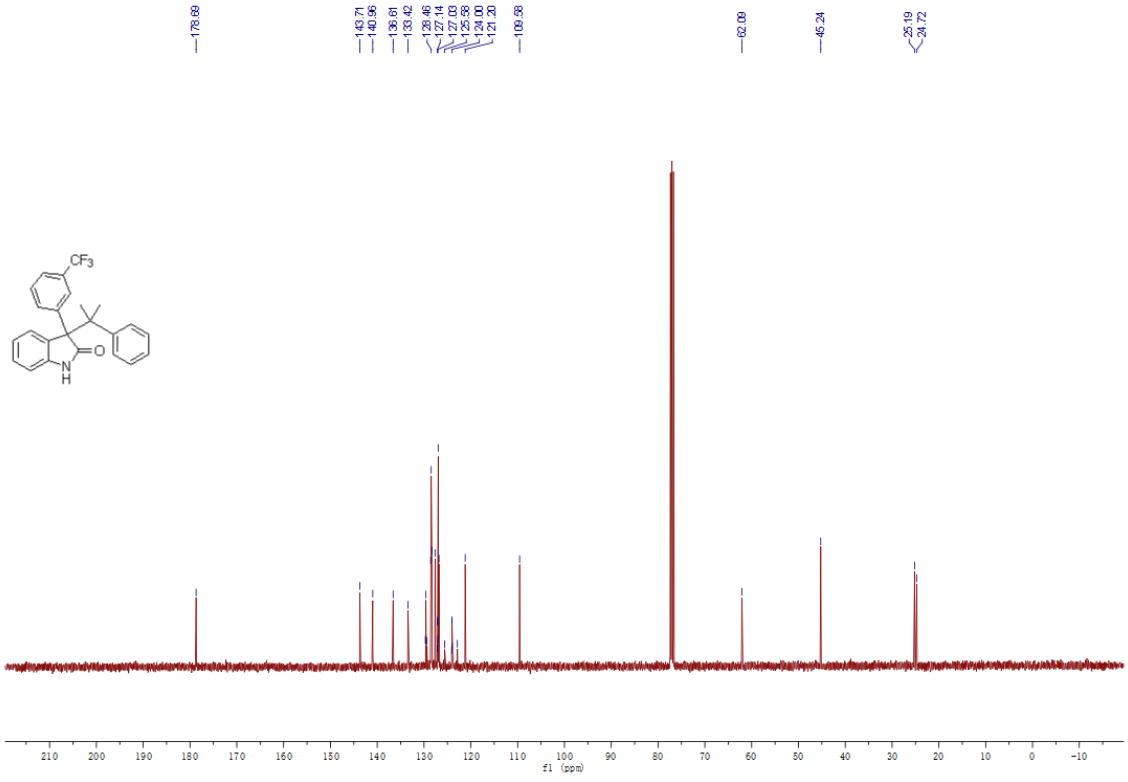

**$^{13}$C NMR spectrum of 3-(4-methoxyphenyl)-3-(2-phenylpropan-2-yl)indolin-2-one (9):**



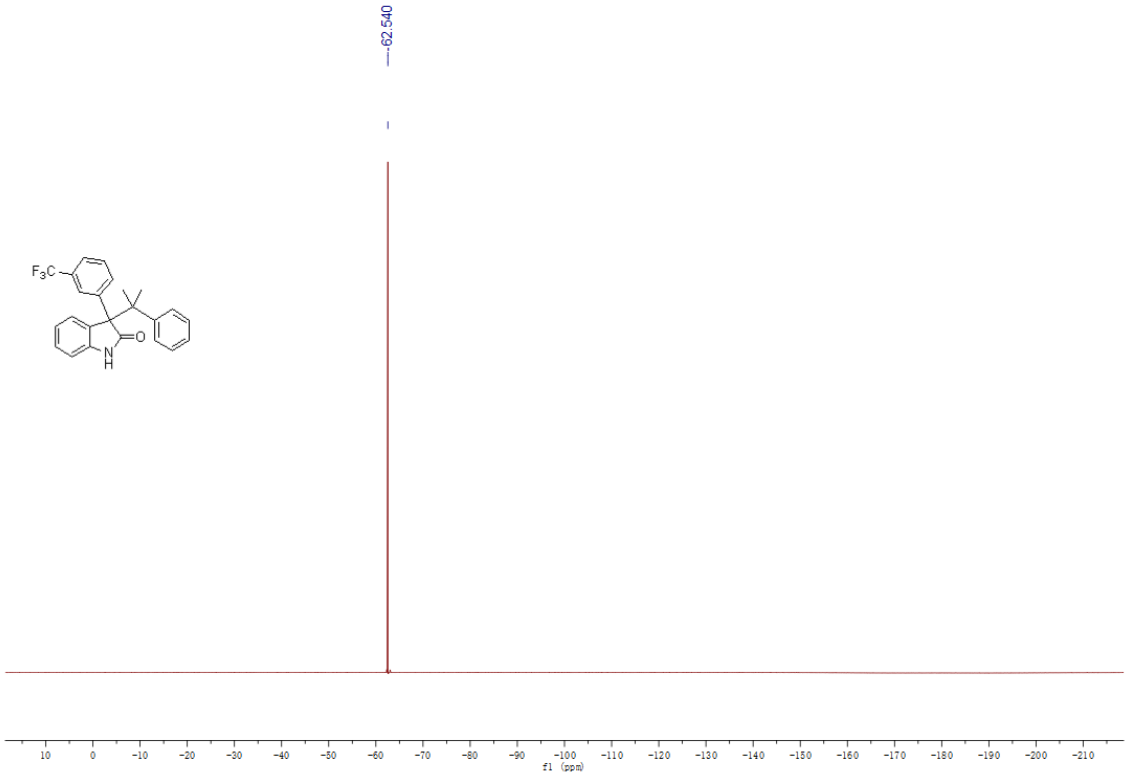
**$^{1}$H NMR spectrum of 3-(2-phenylpropan-2-yl)-3-(3-(trifluoromethyl)phenyl)indolin-2-one (10):**



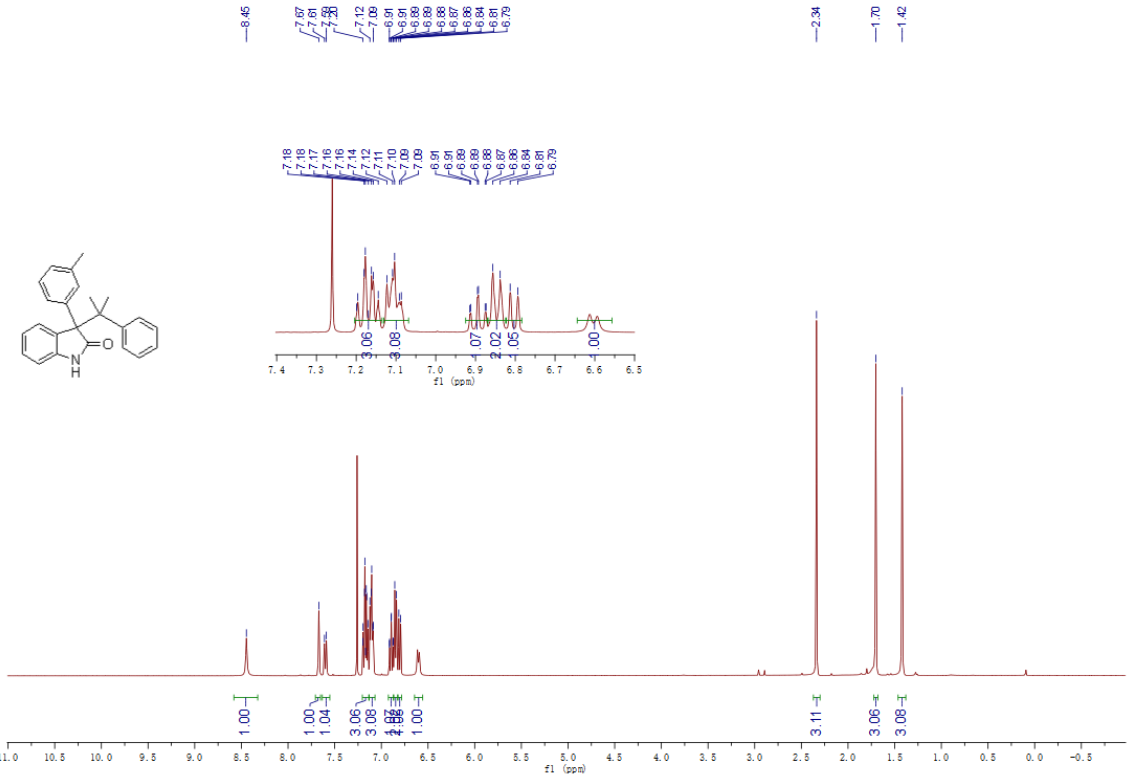
**$^{13}$C NMR spectrum of 3-(2-phenylpropan-2-yl)-3-(3-(trifluoromethyl)phenyl)indolin-2-one (10):**



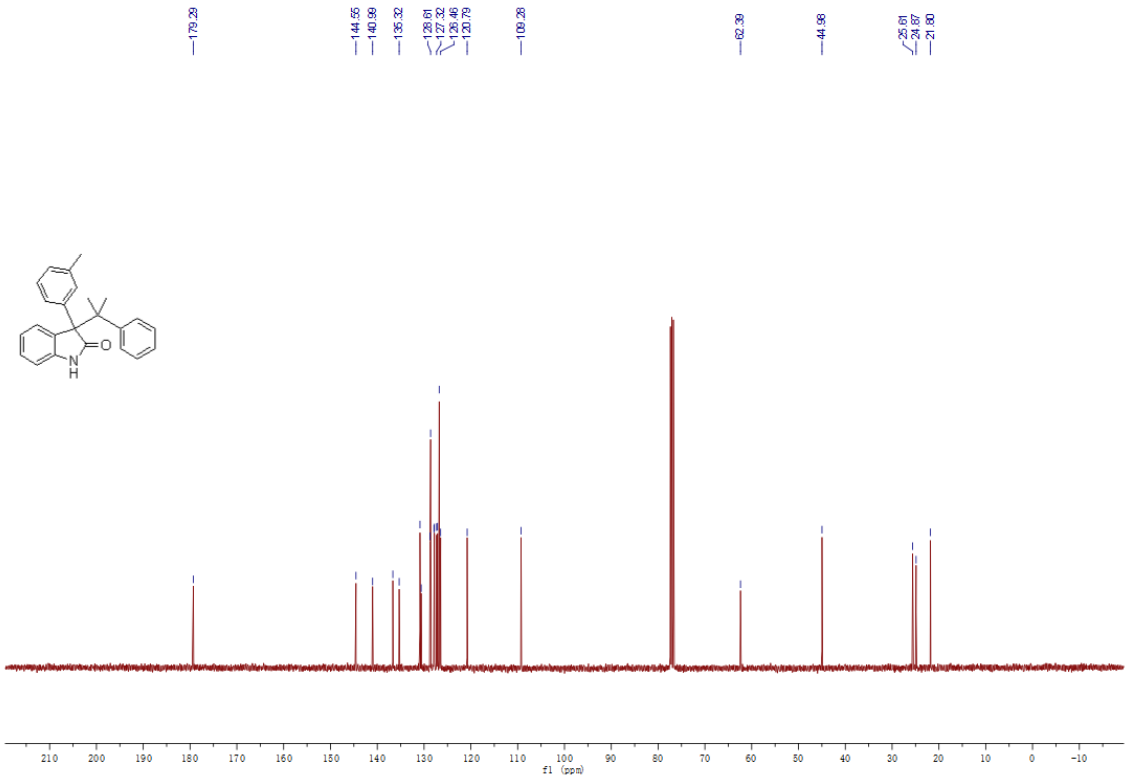
**$^{19}$F NMR spectrum of 3-(2-phenylpropan-2-yl)-3-(3-(trifluoromethyl)phenyl)indolin-2-one (10):**



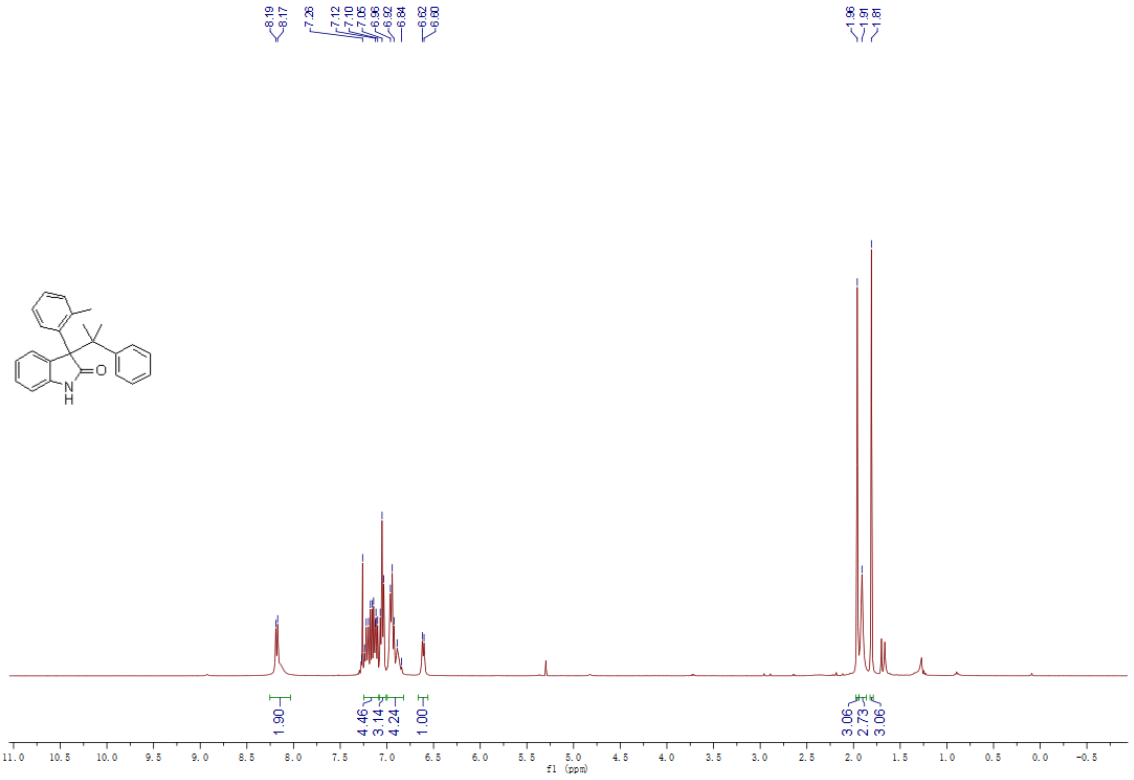
**$^{1}$H NMR spectrum of 3-(2-phenylpropan-2-yl)-3-(m-tolyl)indolin-2-one (11):**



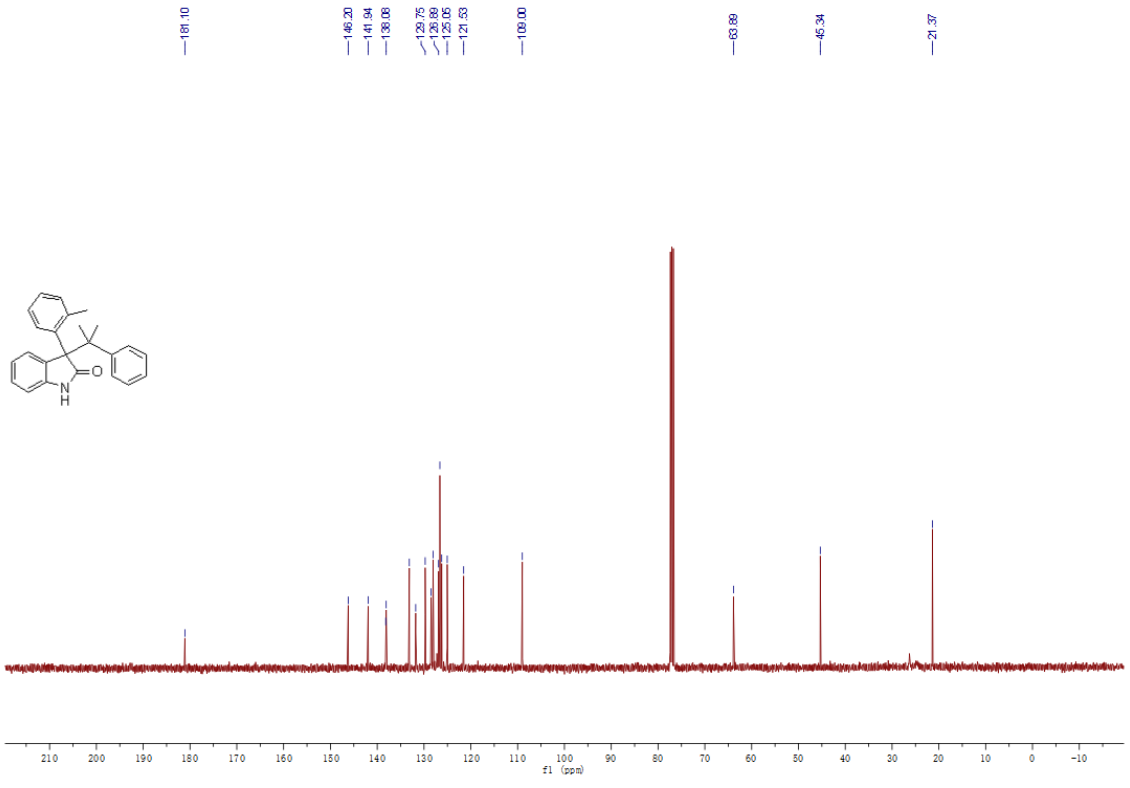
**$^{13}$C NMR spectrum of 3-(2-phenylpropan-2-yl)-3-(m-tolyl)indolin-2-one (11):**



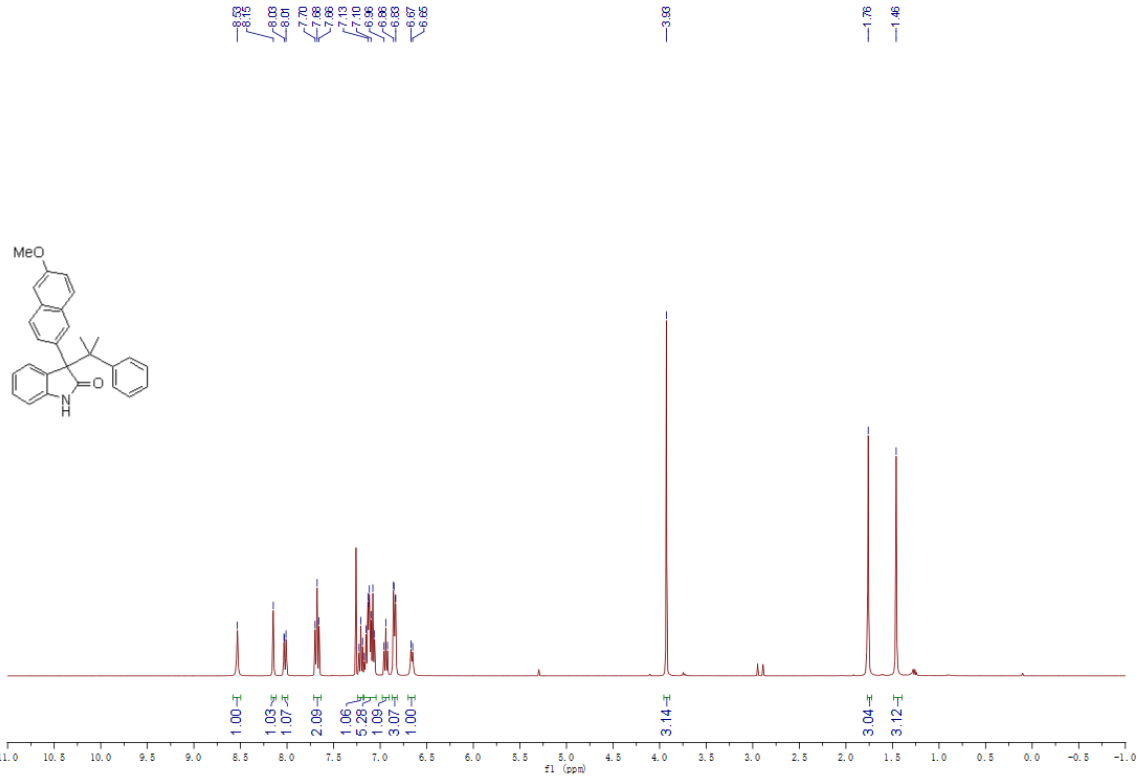
**$^{1}$H NMR spectrum of 3-(2-phenylpropan-2-yl)-3-(o-tolyl)indolin-2-one (12):**



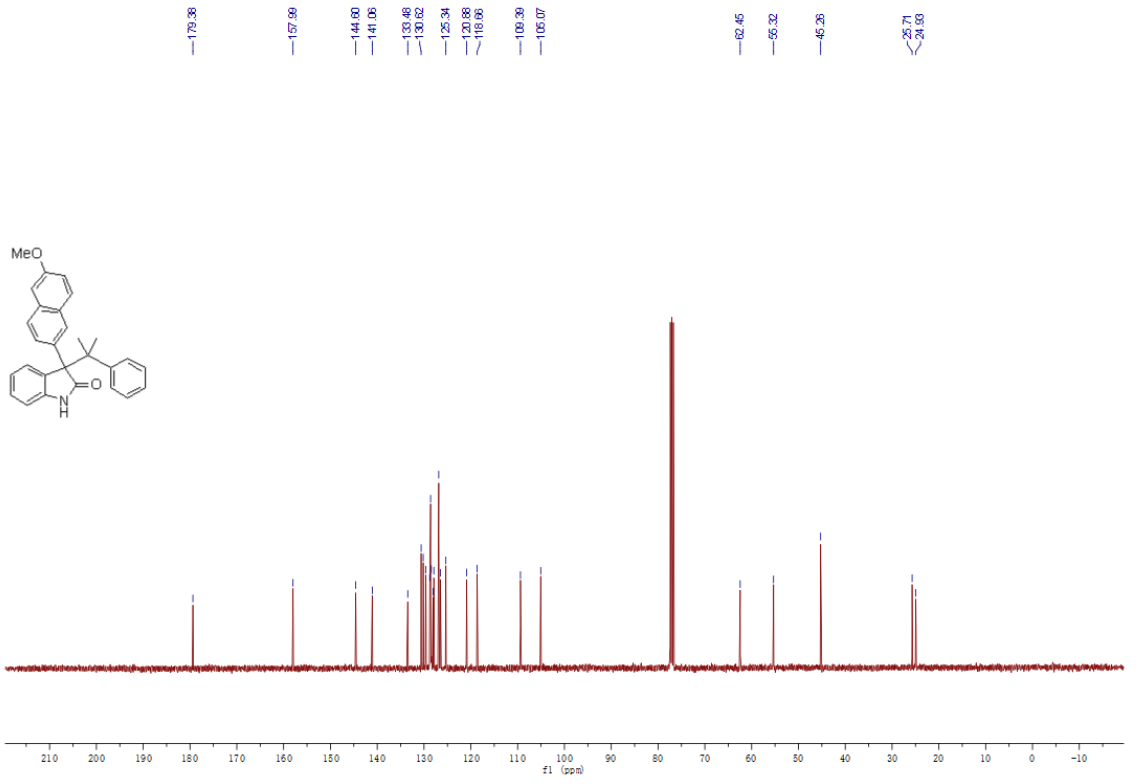

**$^{13}$C NMR spectrum of 3-(2-phenylpropan-2-yl)-3-(o-tolyl)indolin-2-one (12):**



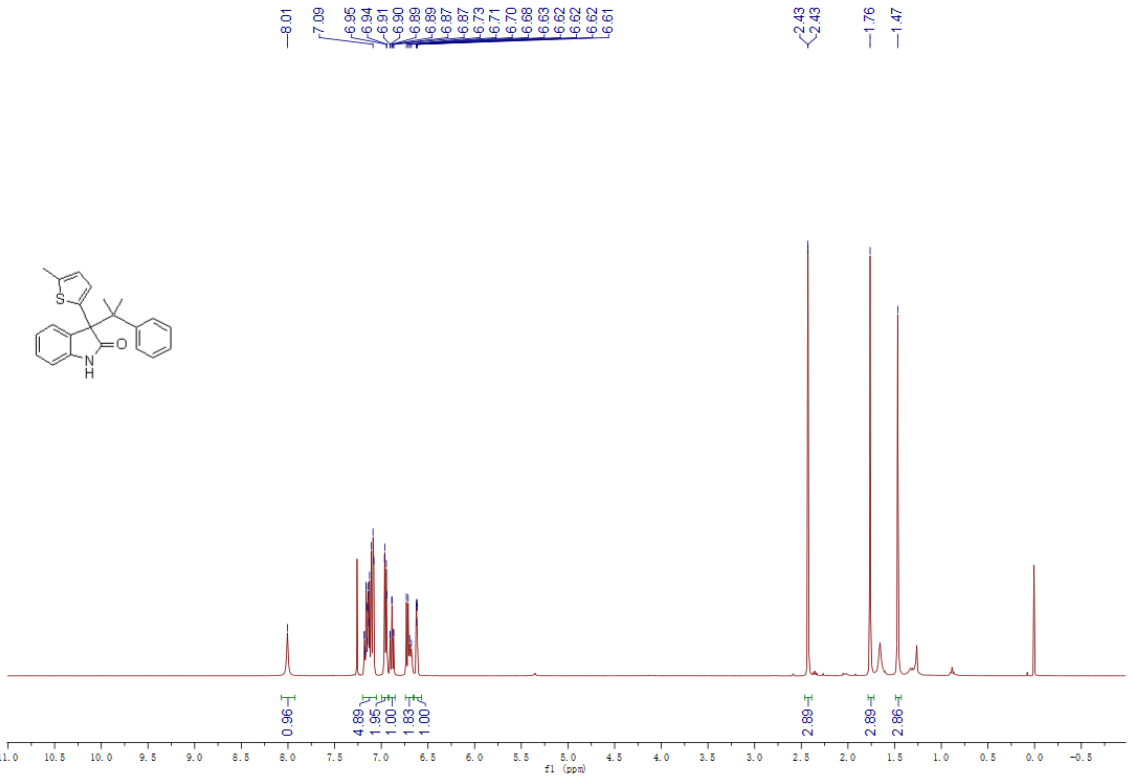
**$^{1}$H NMR spectrum of 3-(6-methoxynaphthalen-2-yl)-3-(2-phenylpropan-2-yl)indolin-2-one (13):**



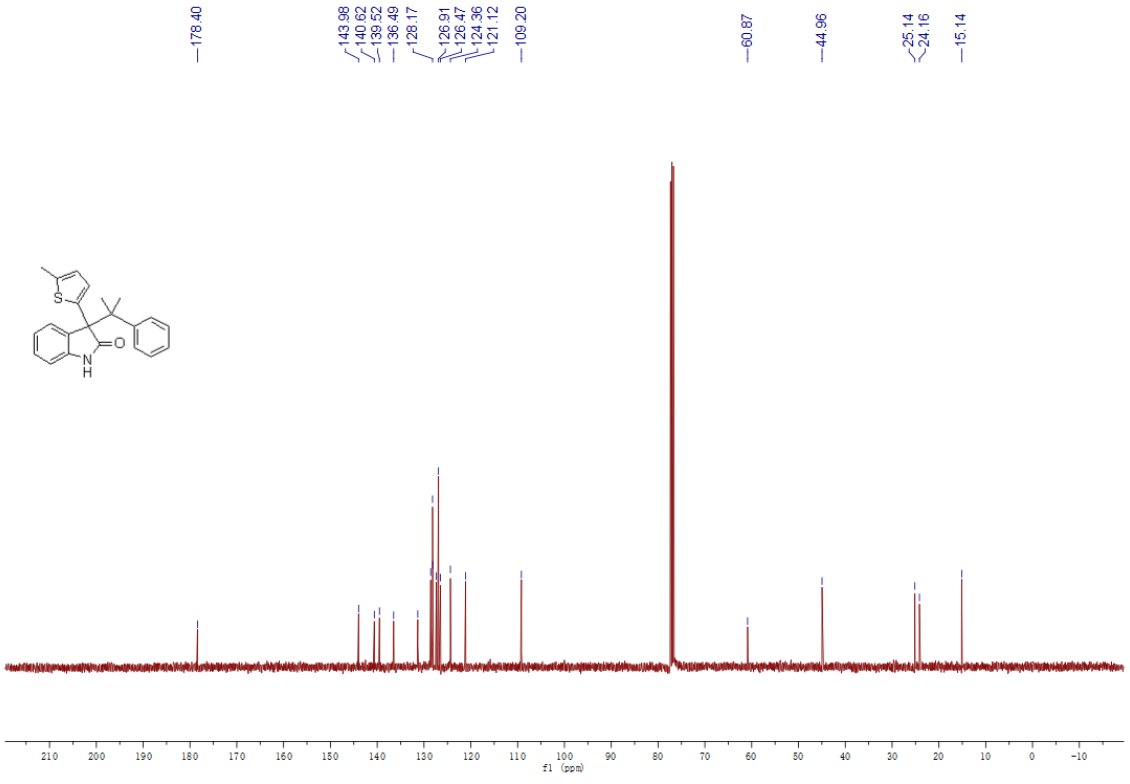

**$^{13}$C NMR spectrum of 3-(6-methoxynaphthalen-2-yl)-3-(2-phenylpropan-2-yl)indolin-2-one (13):**



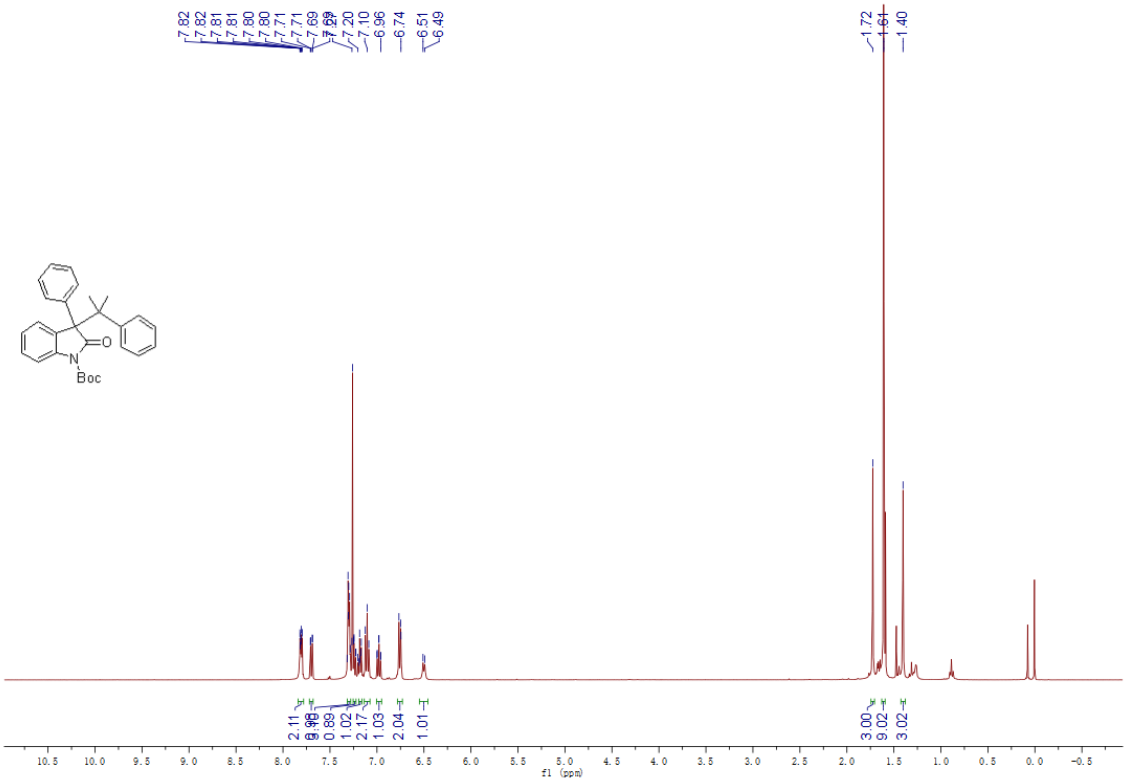
**$^{1}$H NMR spectrum of 3-(5-methylthiophen-2-yl)-3-(2-phenylpropan-2-yl)indolin-2-one (14):**



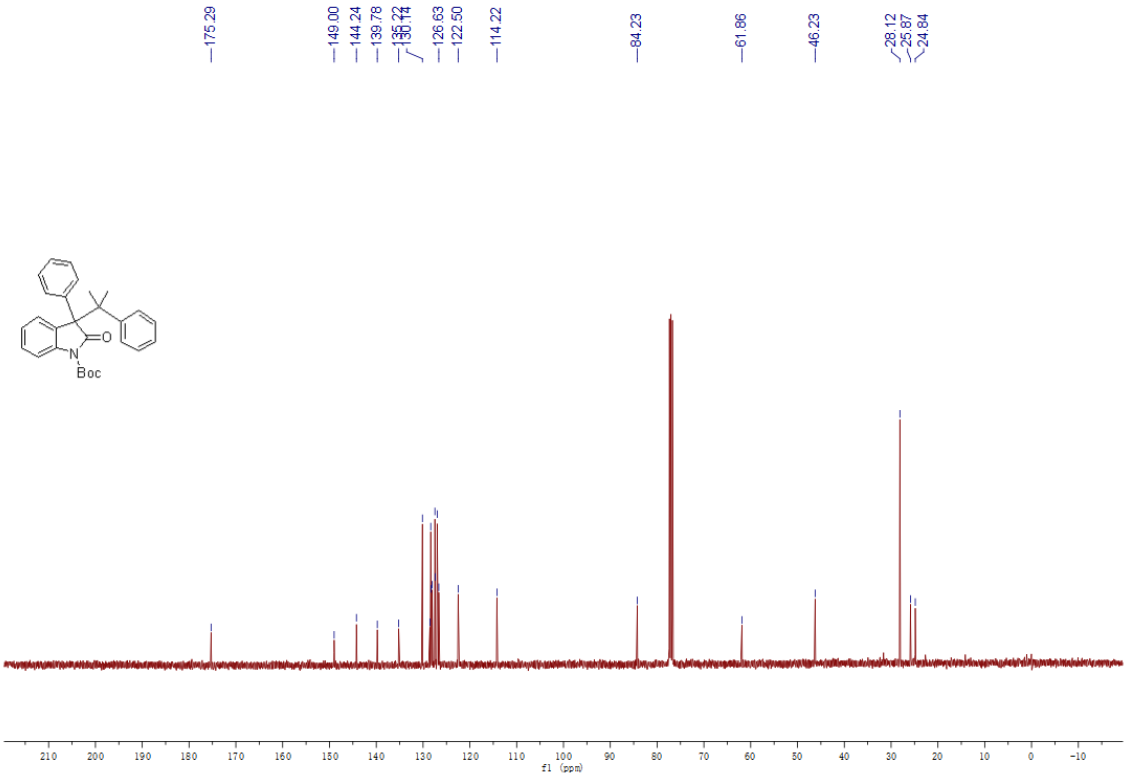

**$^{13}$C NMR spectrum of 3-(5-methylthiophen-2-yl)-3-(2-phenylpropan-2-yl)indolin-2-one (14):**



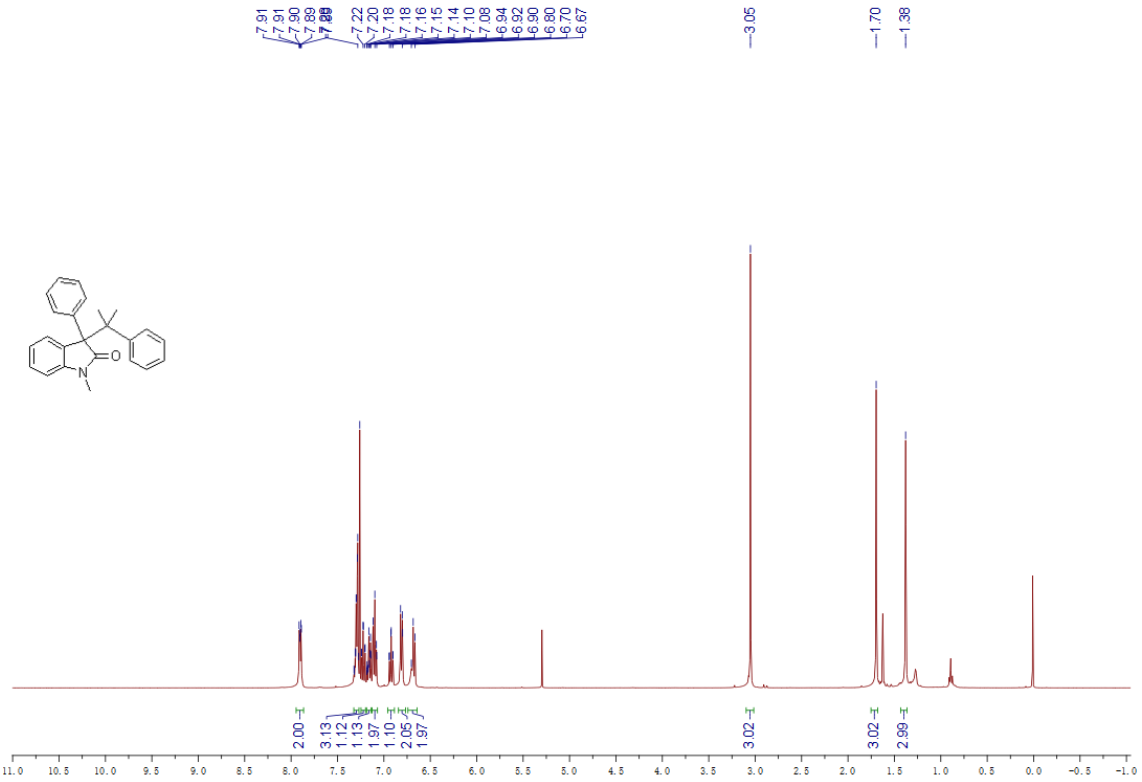
**$^1$H NMR spectrum of tert-butyl 2-oxo-3-phenyl-3-(2-phenylpropan-2-yl)indoline-1-carboxylate (15):**



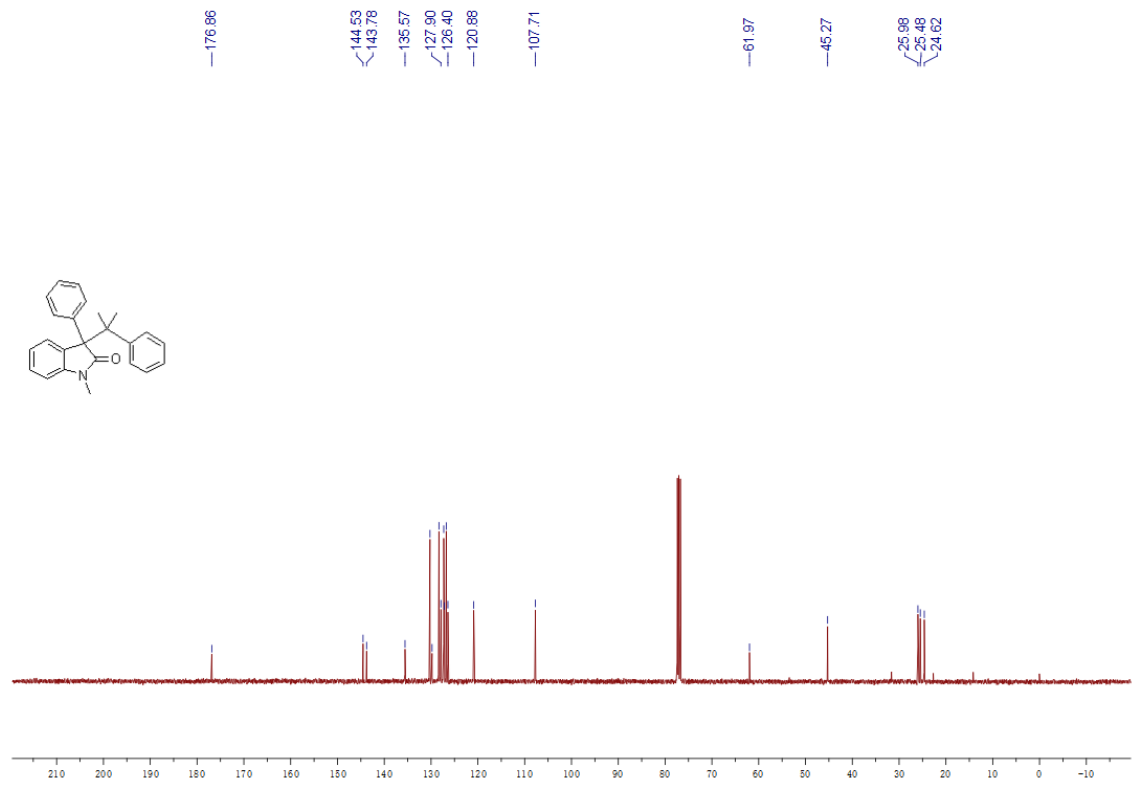

**$^1$H NMR spectrum of tert-butyl 2-oxo-3-phenyl-3-(2-phenylpropan-2-yl)indoline-1-carboxylate (15):**



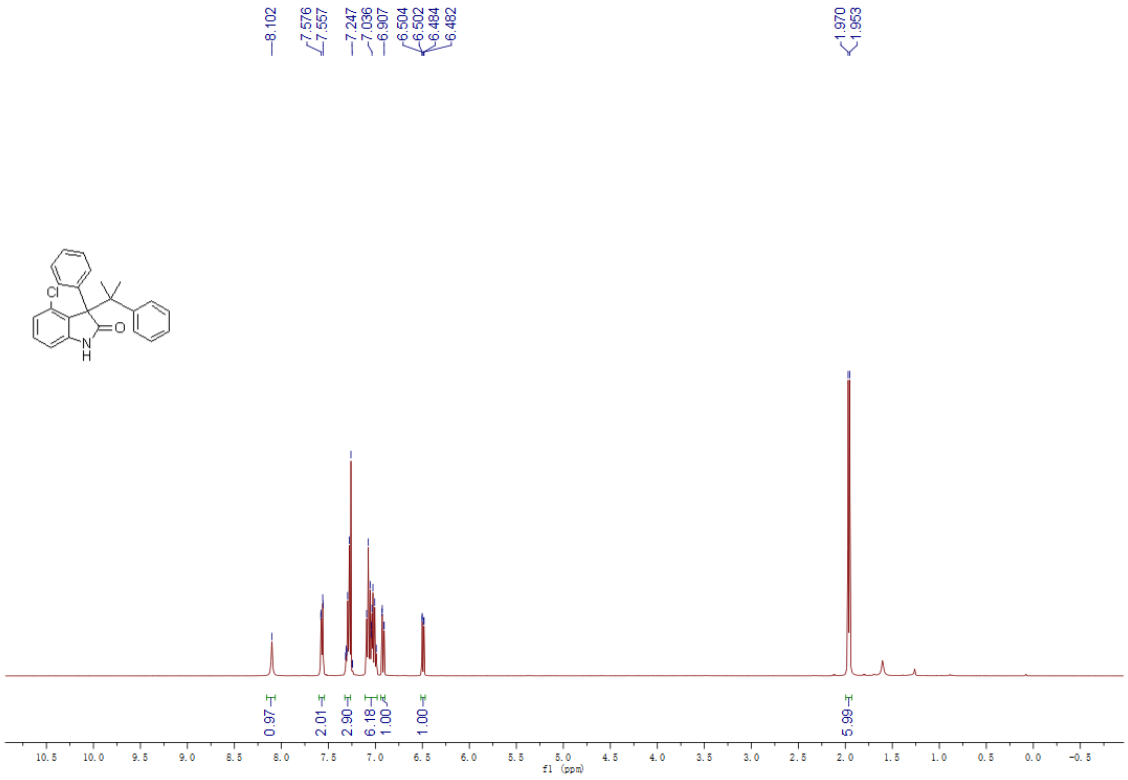
**$^1$H NMR spectrum of 1-methyl-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (16):**



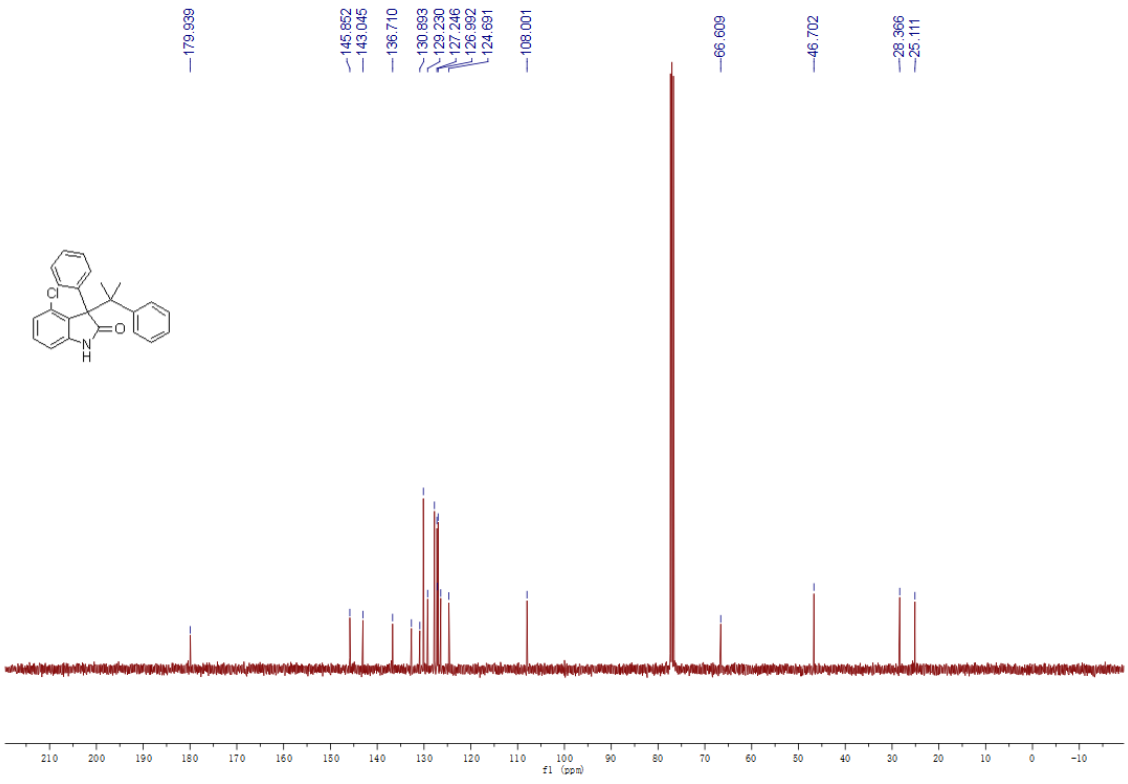

**$^1$H NMR spectrum of 1-methyl-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (16):**



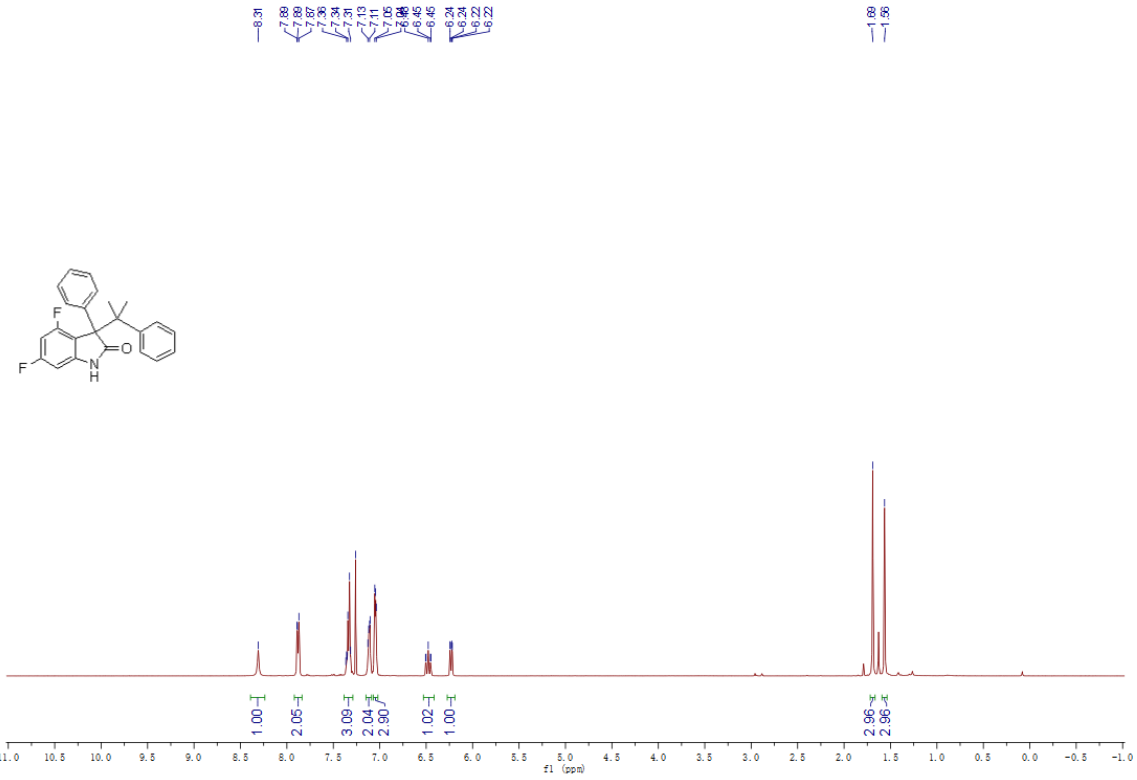
**$^1$H NMR spectrum of 4-chloro-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (17):**



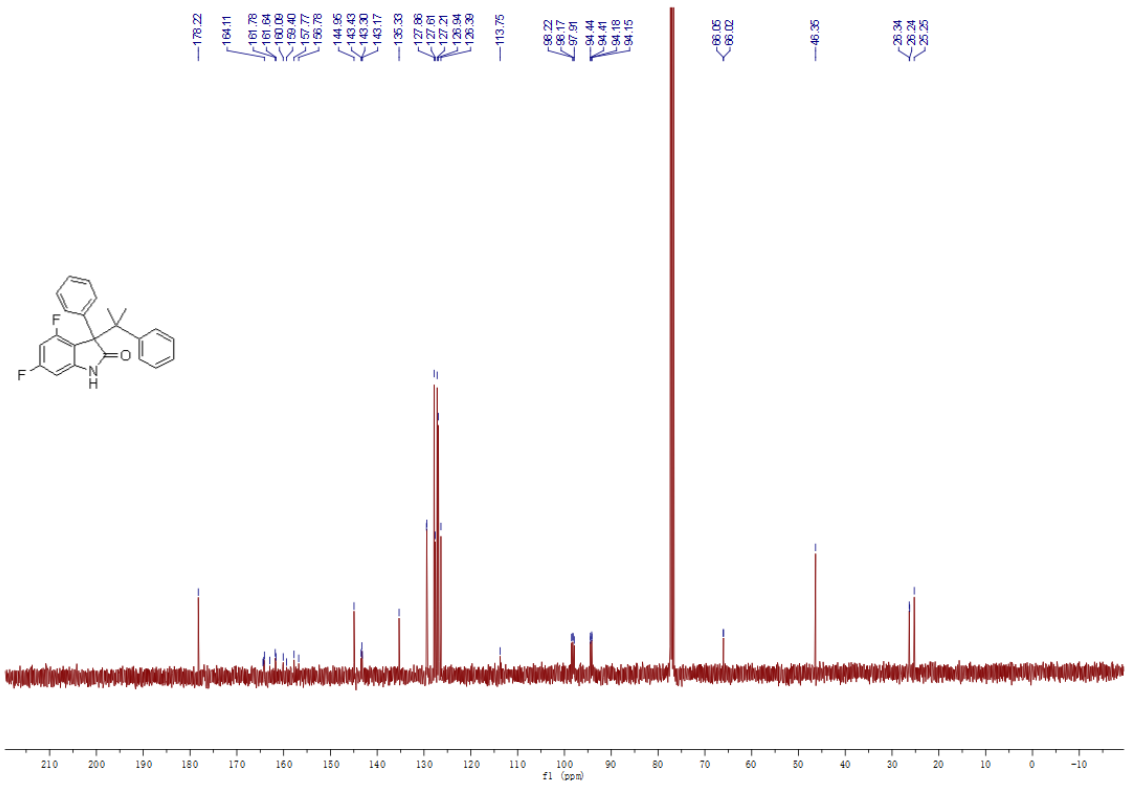

**$^1$H NMR spectrum of 4-chloro-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (17):**



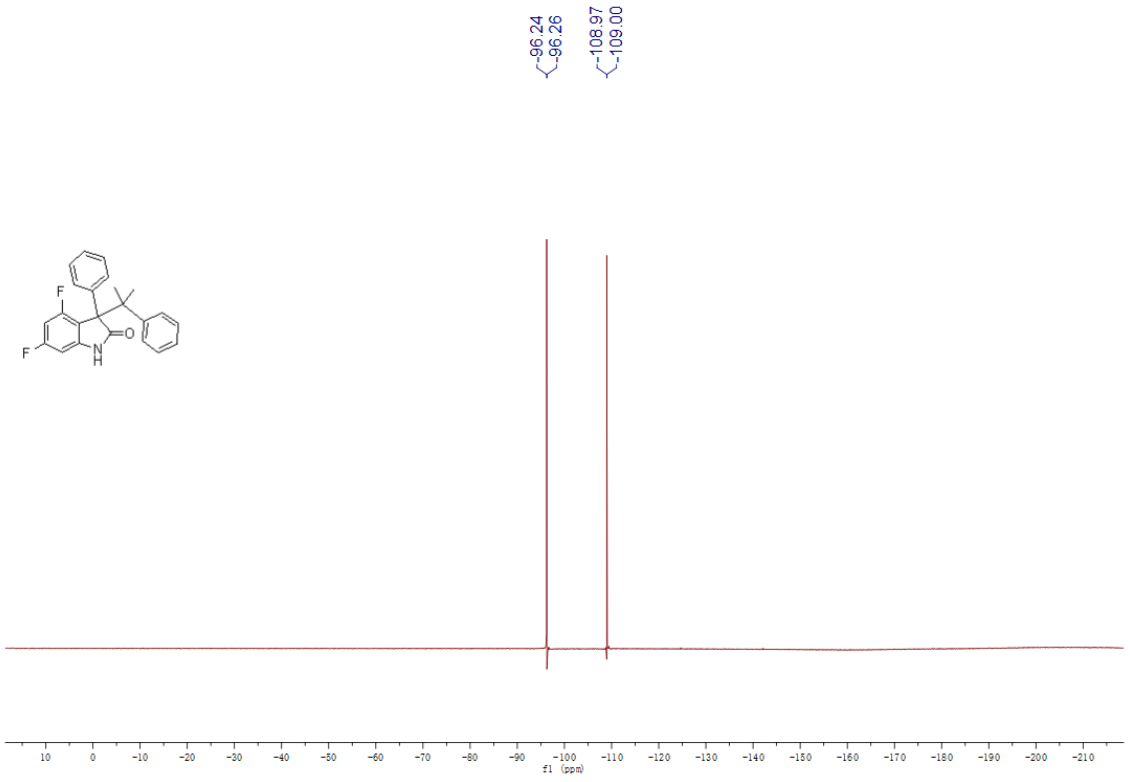
**$^{1}$H NMR spectrum of 4,6-difluoro-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (18):**



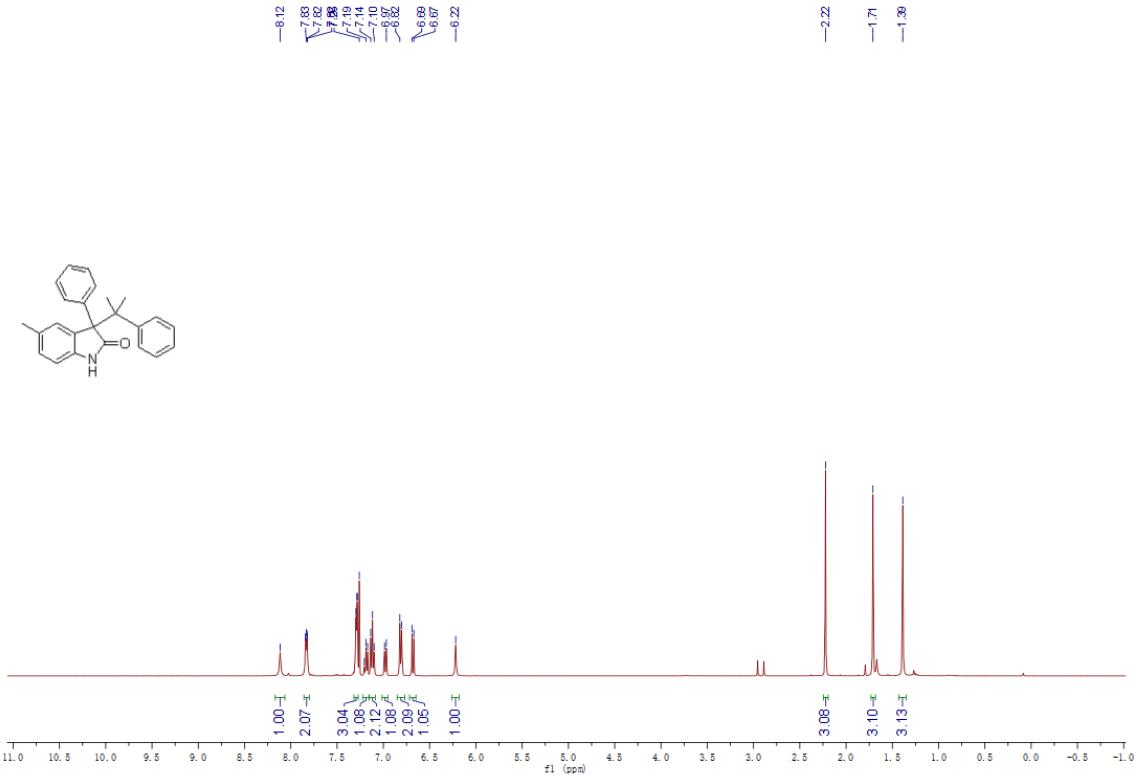

**$^{13}$C NMR spectrum of 4,6-difluoro-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (18):**



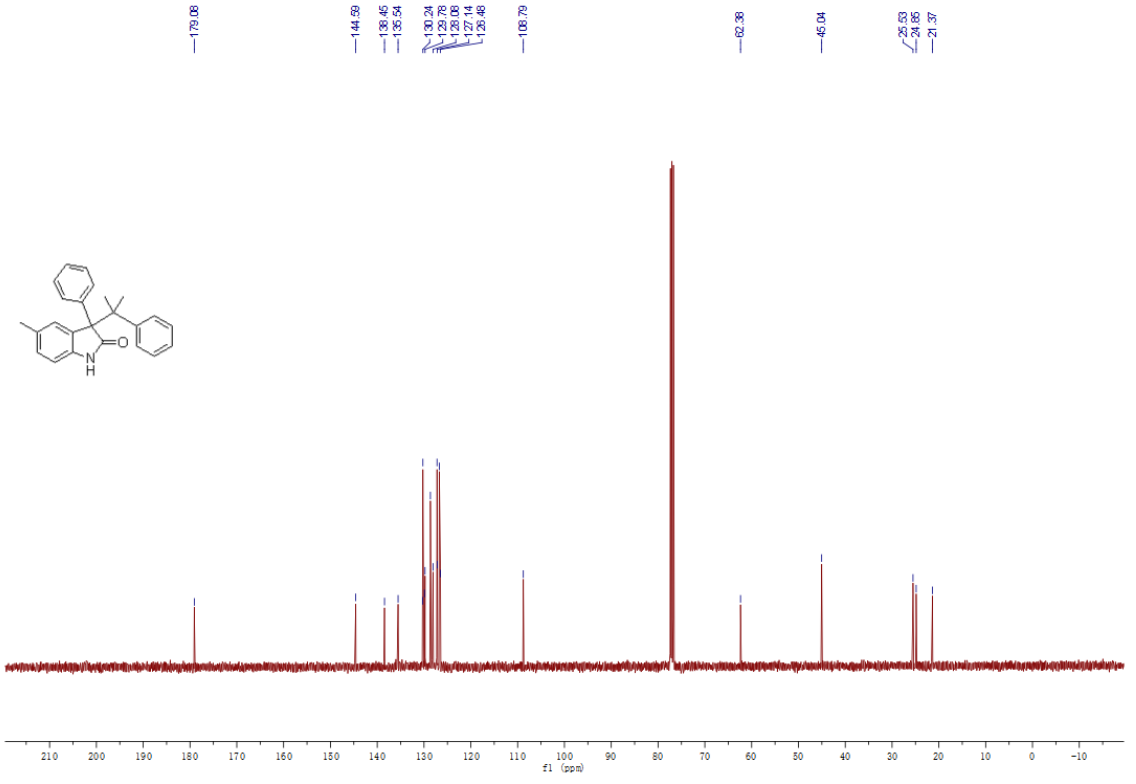
**$^{19}$F NMR spectrum of 4,6-difluoro-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (18):**



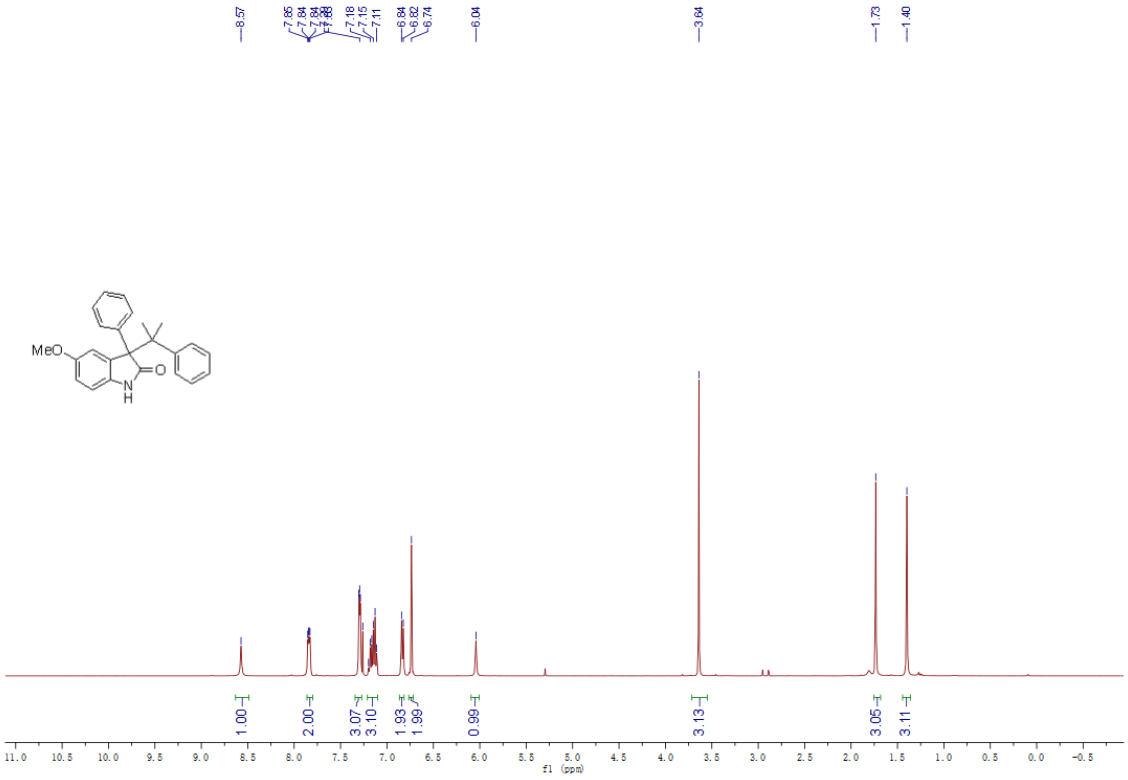
**$^{1}$H NMR spectrum of 5-methyl-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (19):**



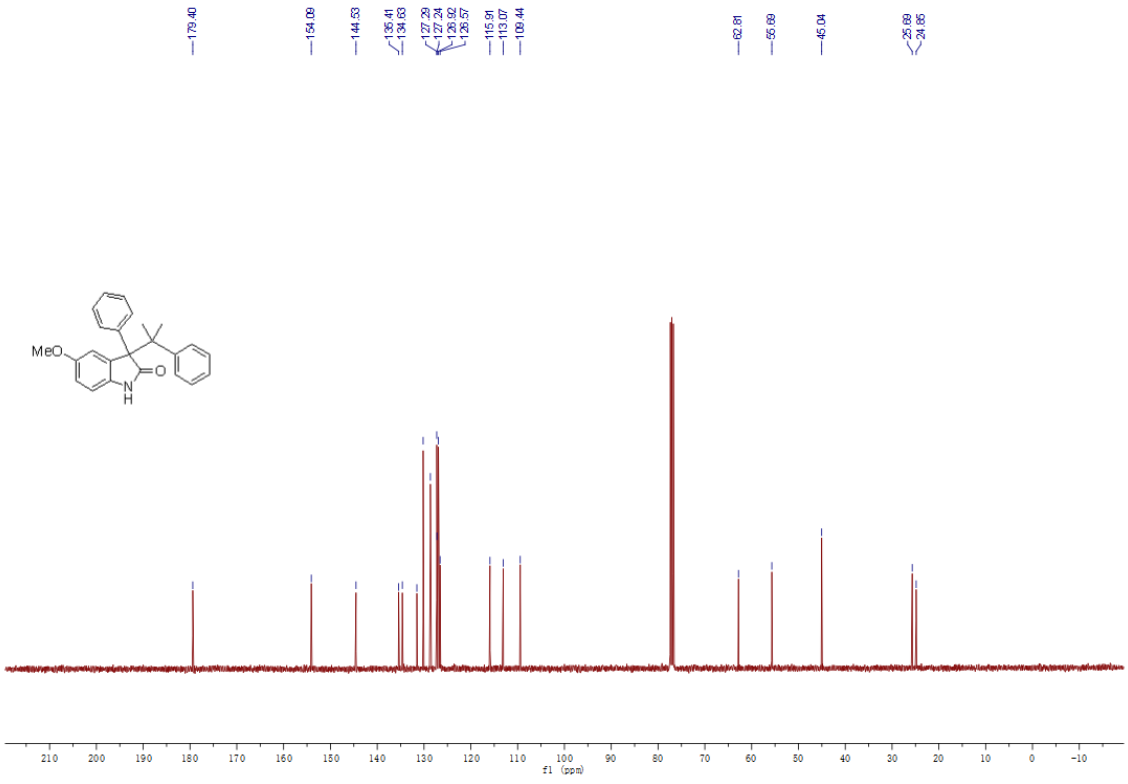

**$^{13}$C NMR spectrum of 5-methyl-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (19):**



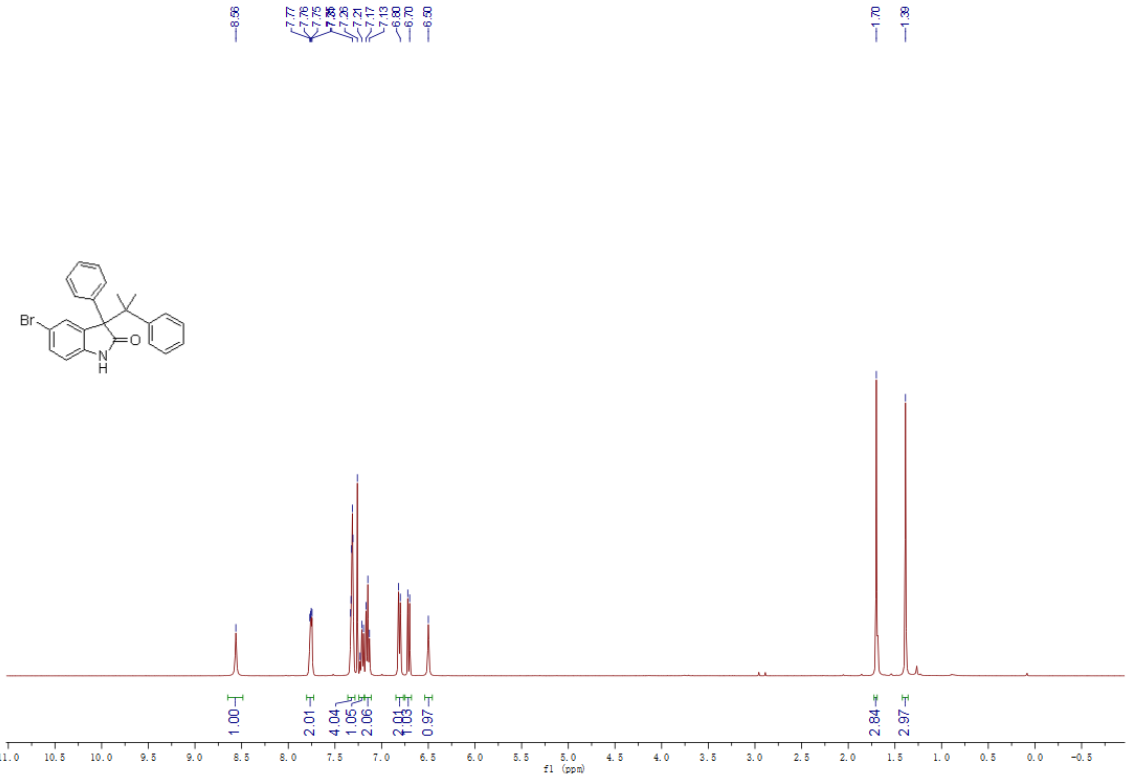
**$^{1}$H NMR spectrum of 5-methoxy-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (20):**



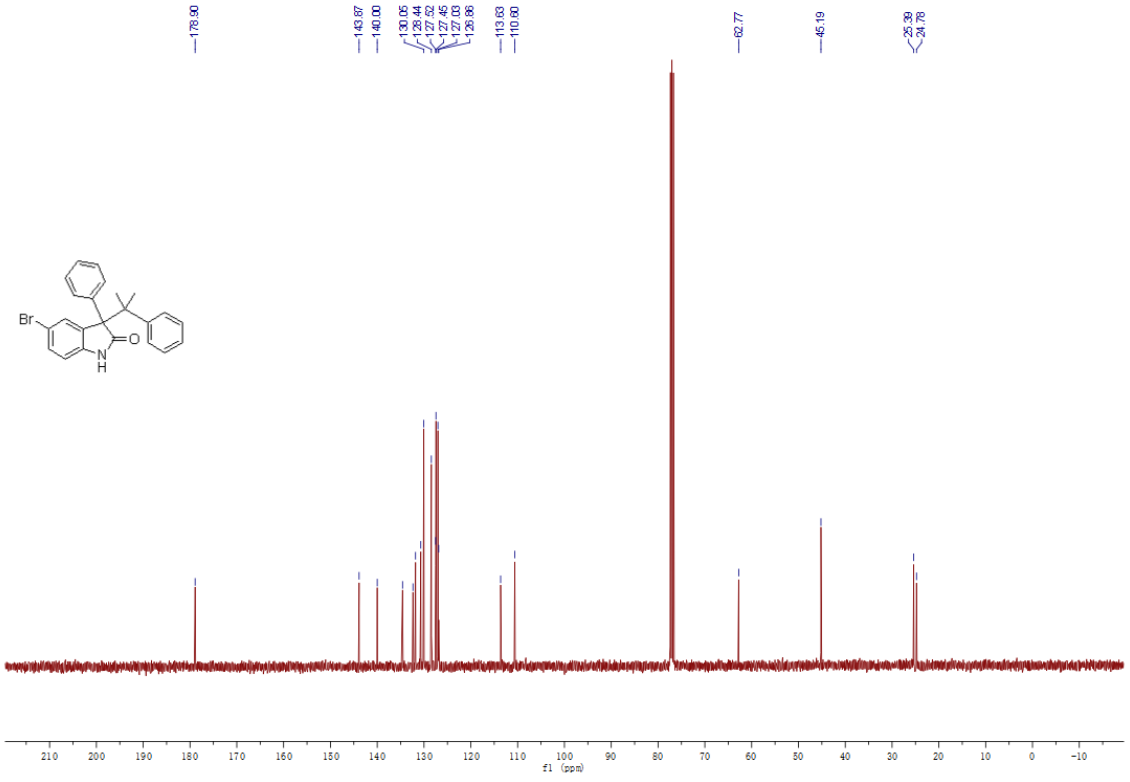

**$^{13}$C NMR spectrum of 5-methoxy-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (20):**



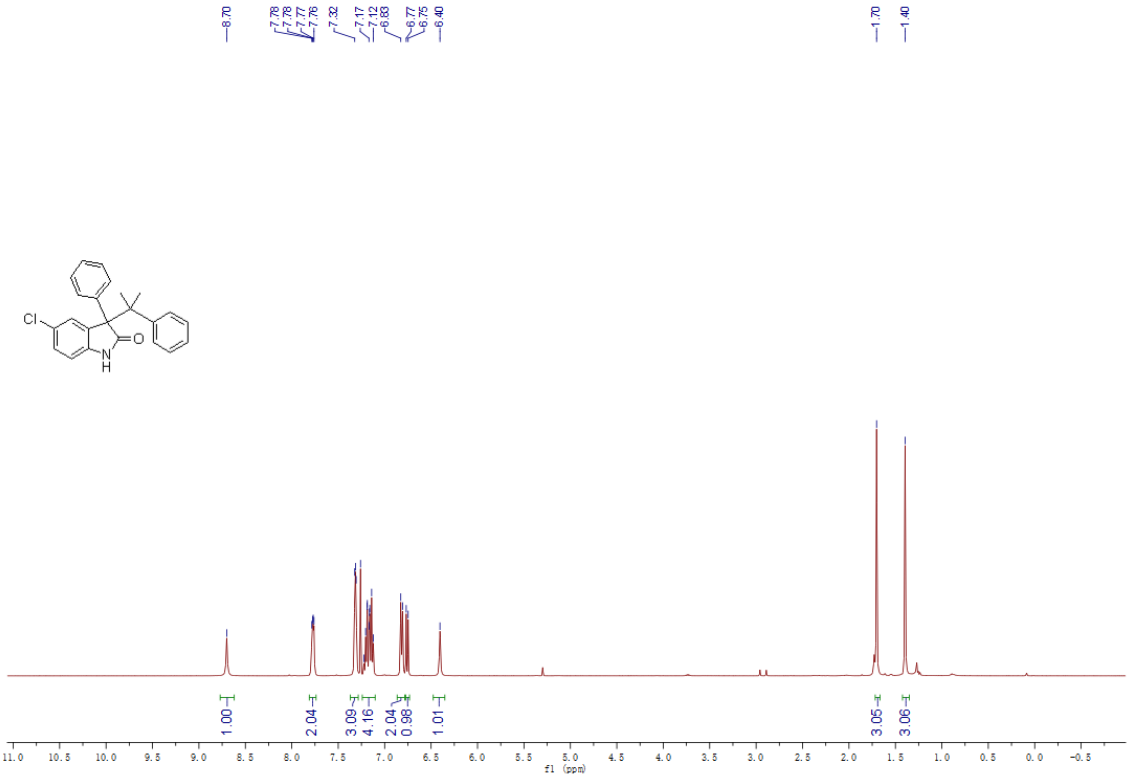
**$^{1}$H NMR spectrum of 5-bromo-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (21):**



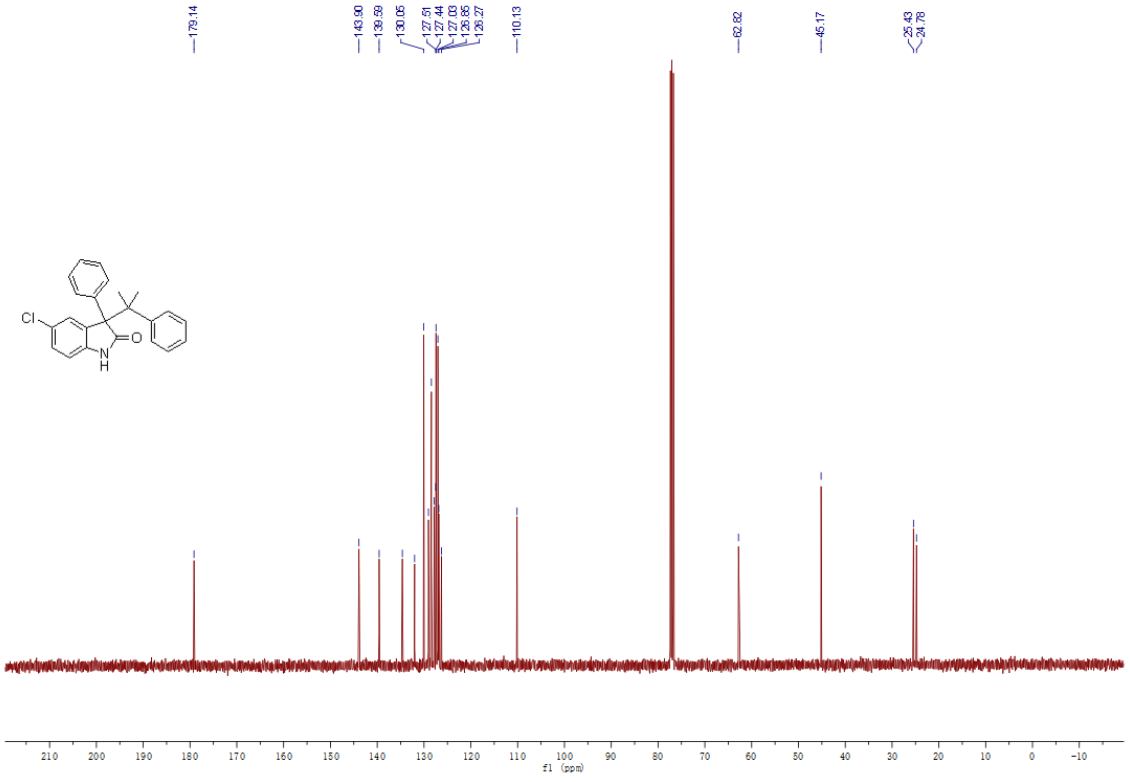

**$^{13}$C NMR spectrum of 5-bromo-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (21):**



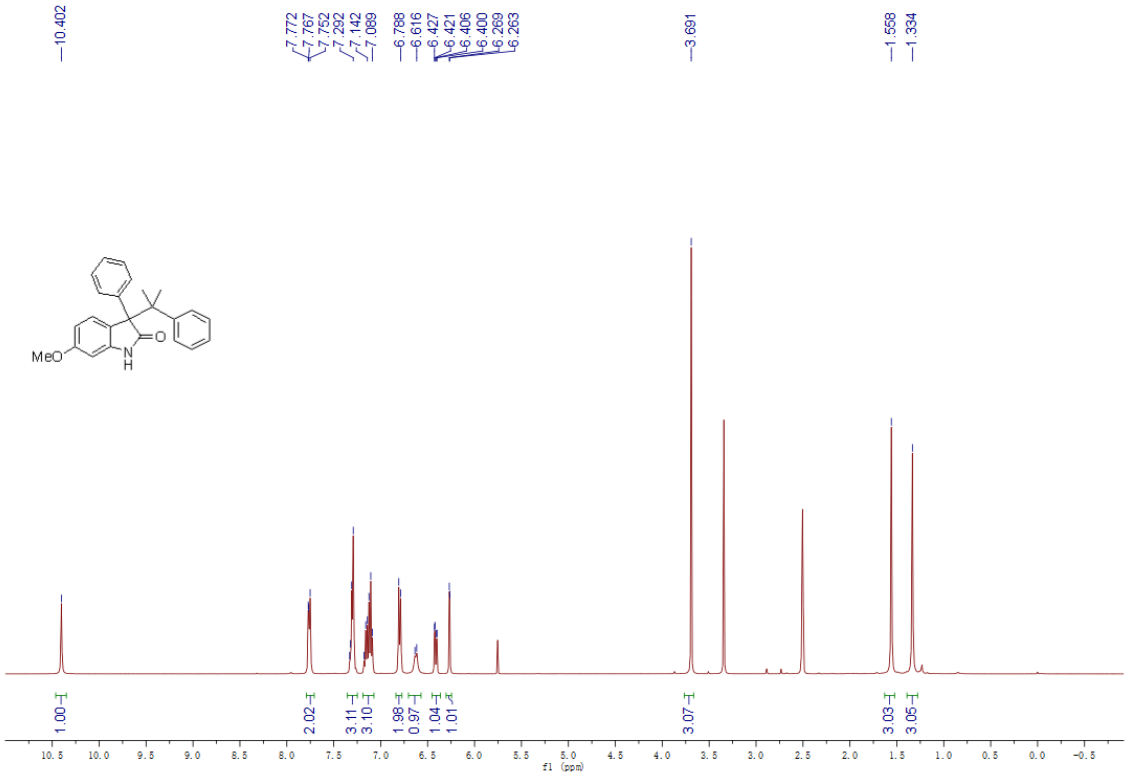
**$^{1}$H NMR spectrum of 5-chloro-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (22):**



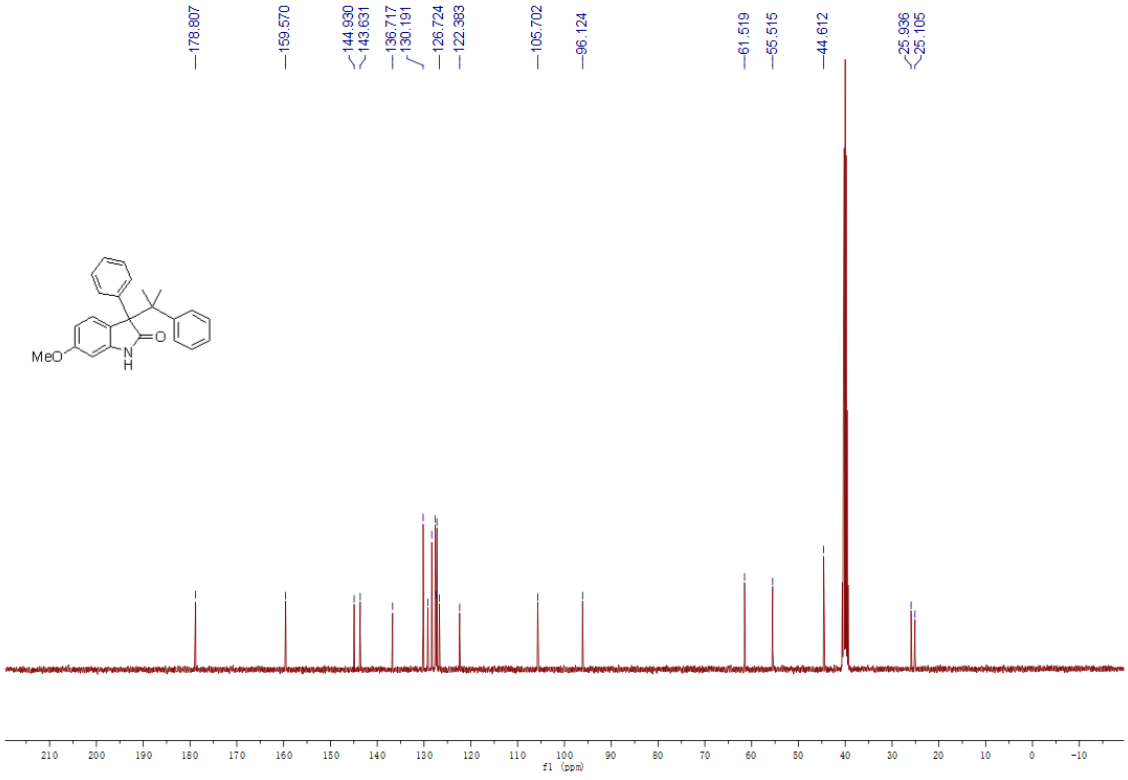

**$^{13}$C NMR spectrum of 5-chloro-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (22):**



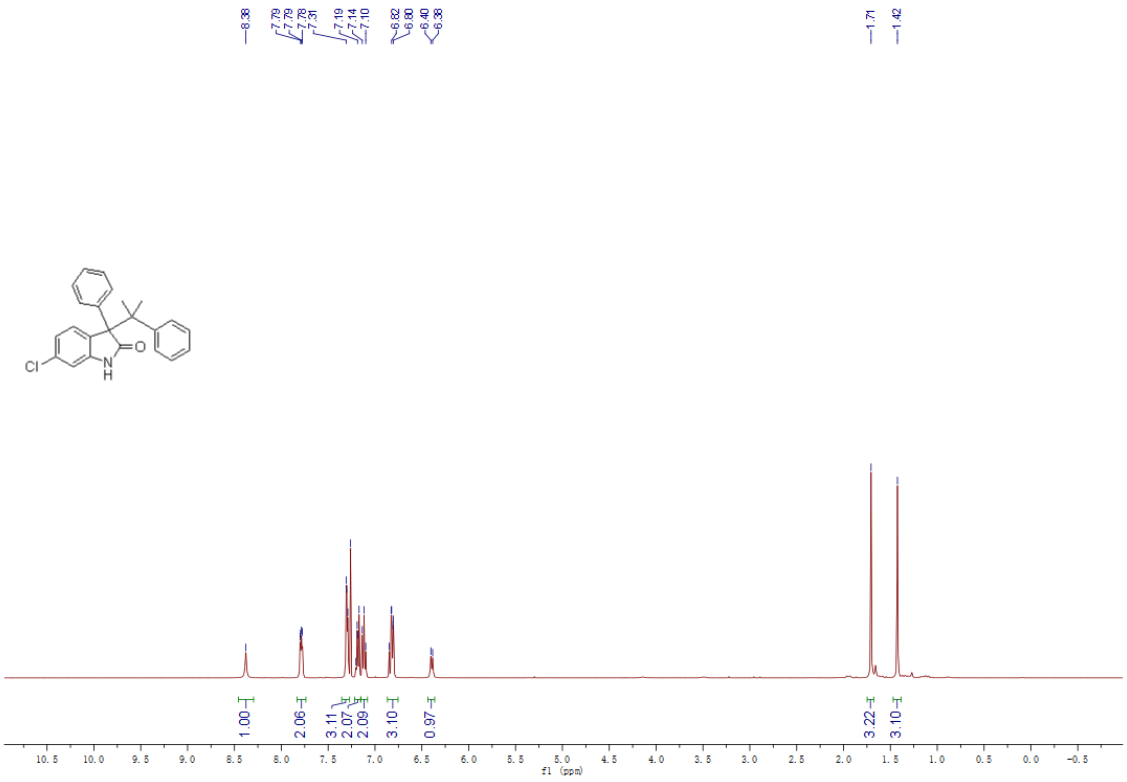
**$^{1}$H NMR spectrum of 6-methoxy-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (23):**



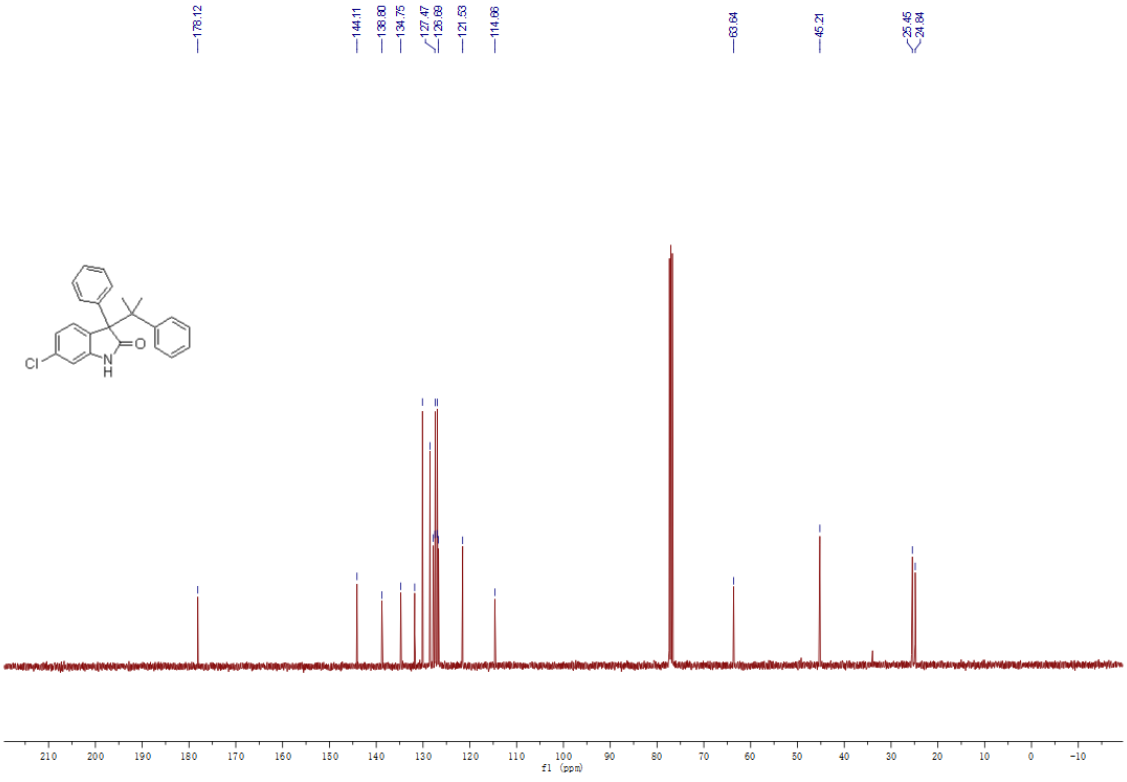

**$^{13}$C NMR spectrum of 6-methoxy-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (23):**



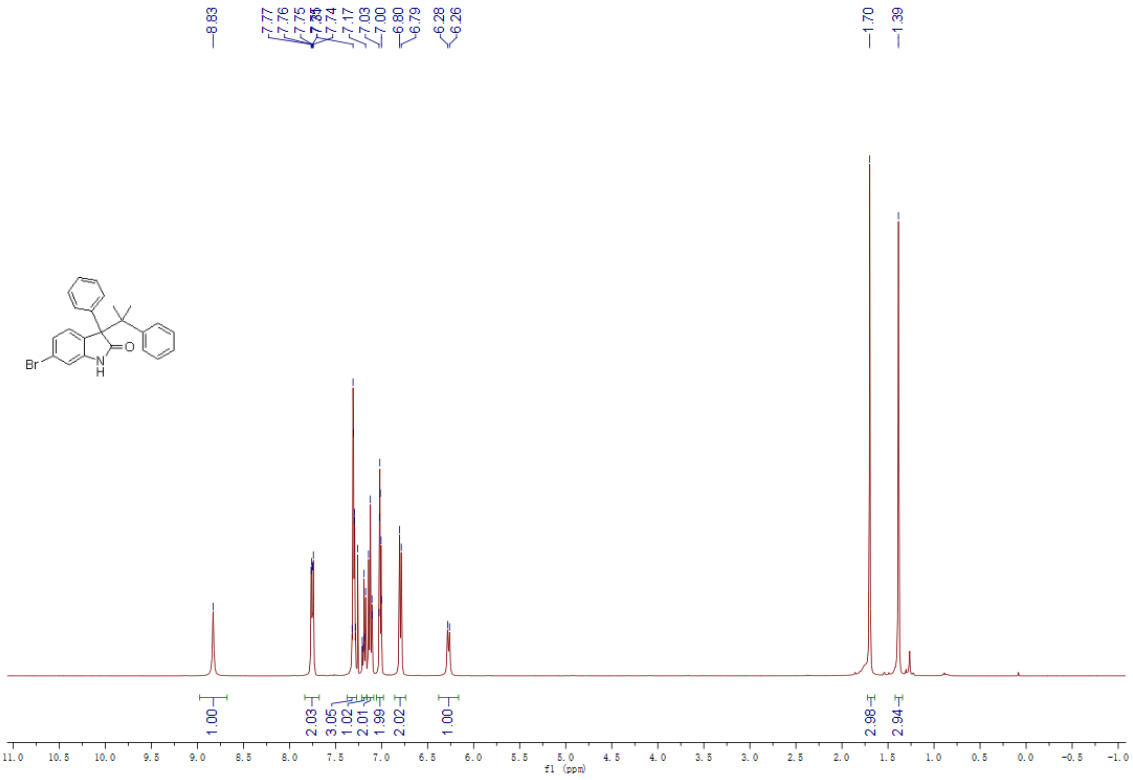
**$^{1}$H NMR spectrum of 6-chloro-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (24):**



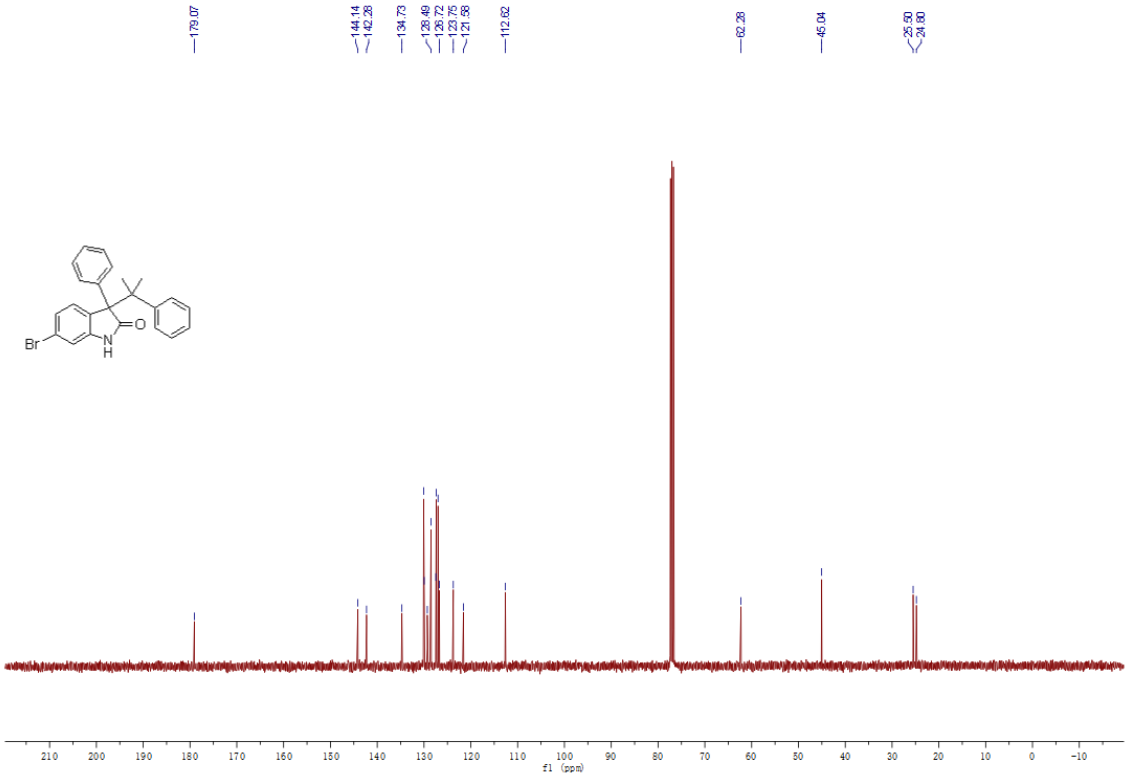

**$^{13}$C NMR spectrum of 6-chloro-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (24):**



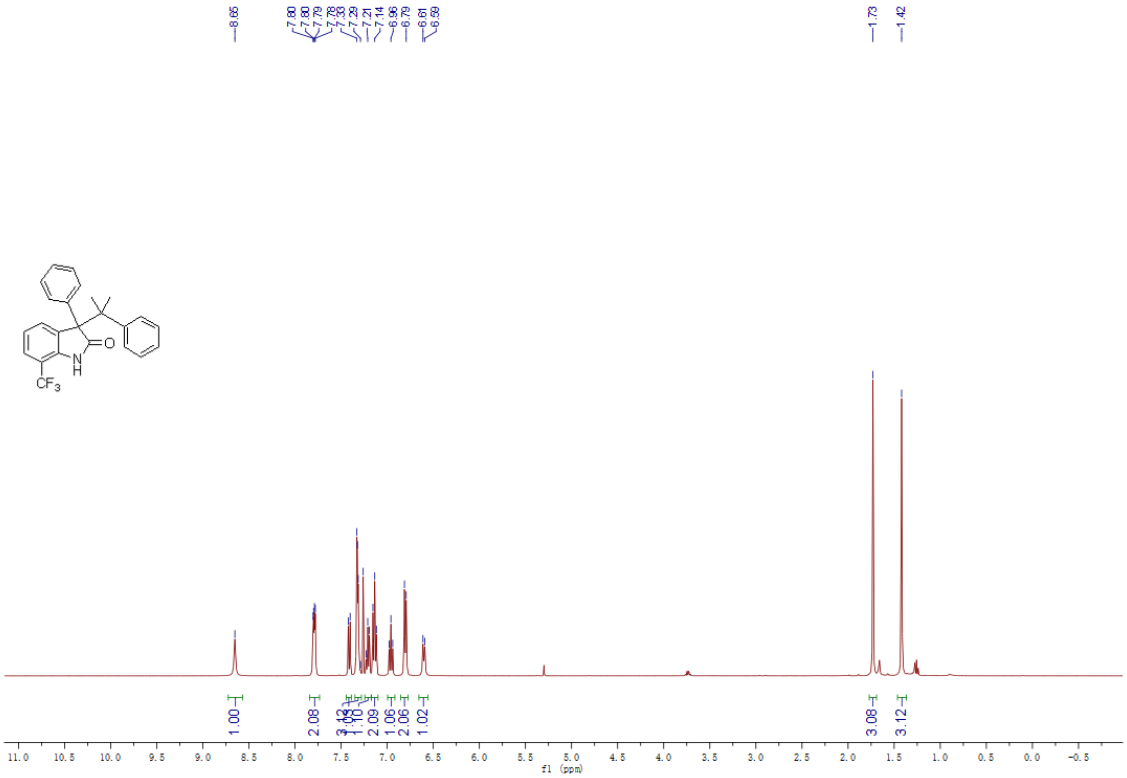
**$^{1}$H NMR spectrum of 6-bromo-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (25):**



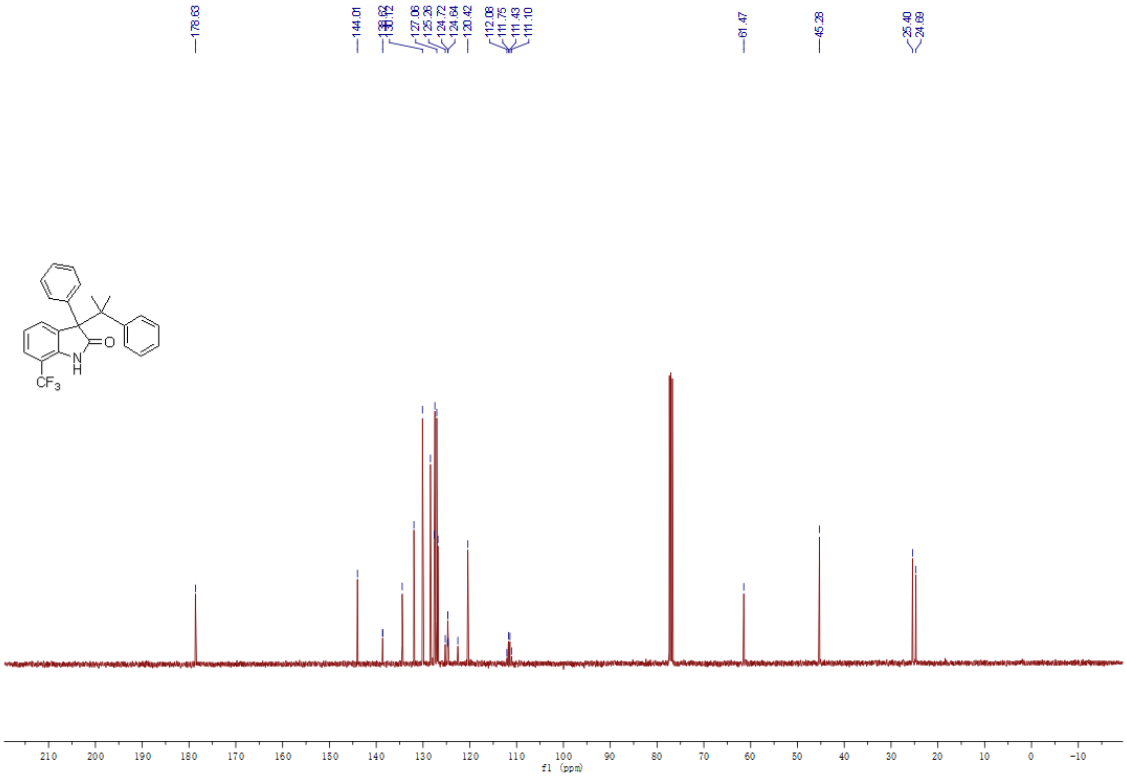

**$^{13}$C NMR spectrum of 6-bromo-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (25):**



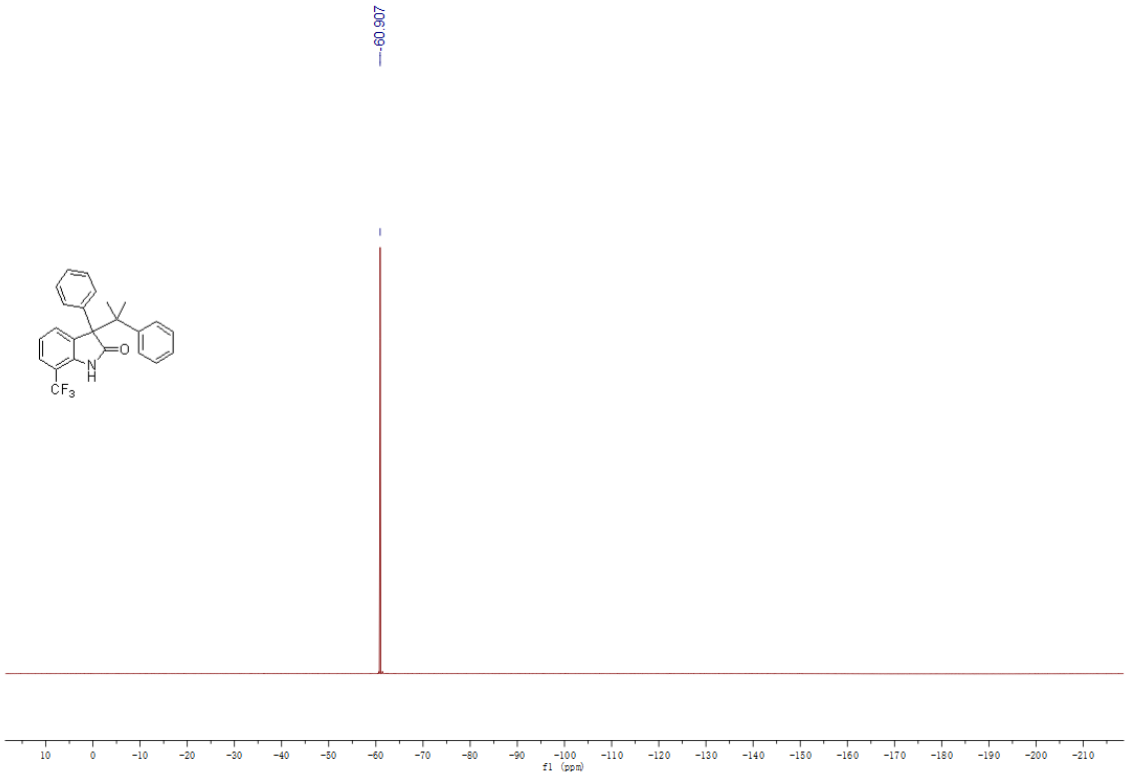
**$^{1}$H NMR spectrum of 3-phenyl-3-(2-phenylpropan-2-yl)-7-(trifluoromethyl)indolin-2-one (26):**



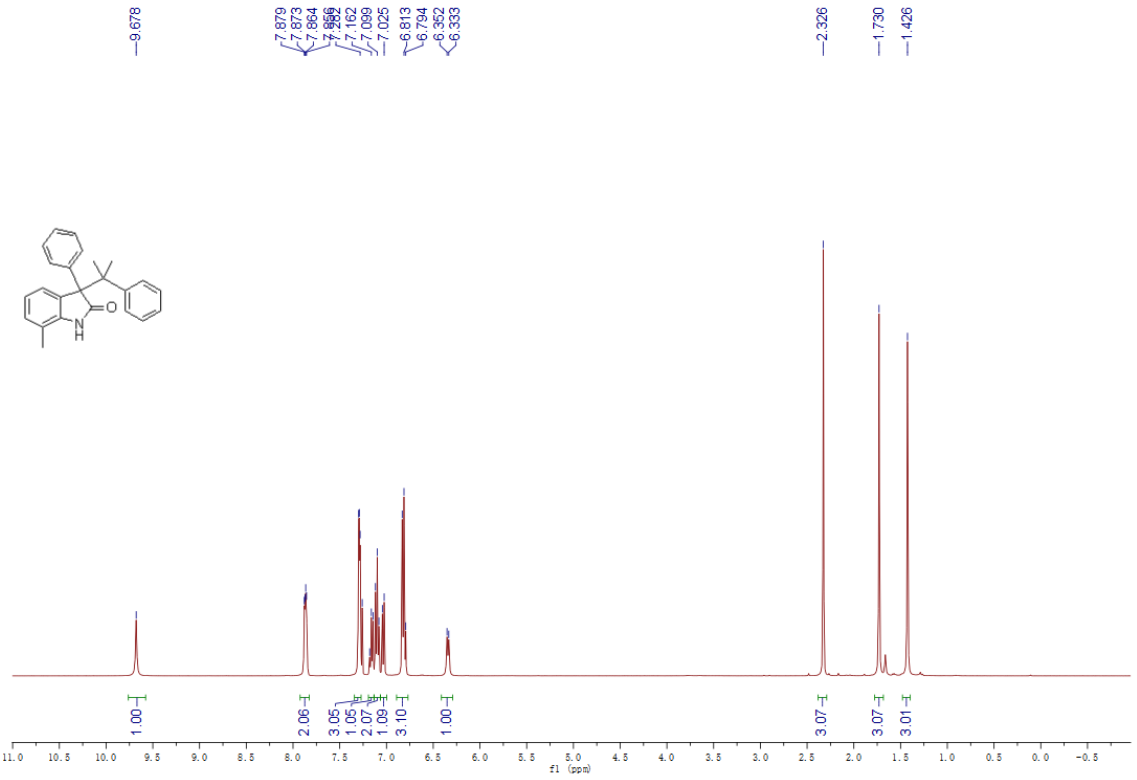

**$^{13}$C NMR spectrum of 3-phenyl-3-(2-phenylpropan-2-yl)-7-(trifluoromethyl)indolin-2-one (26):**



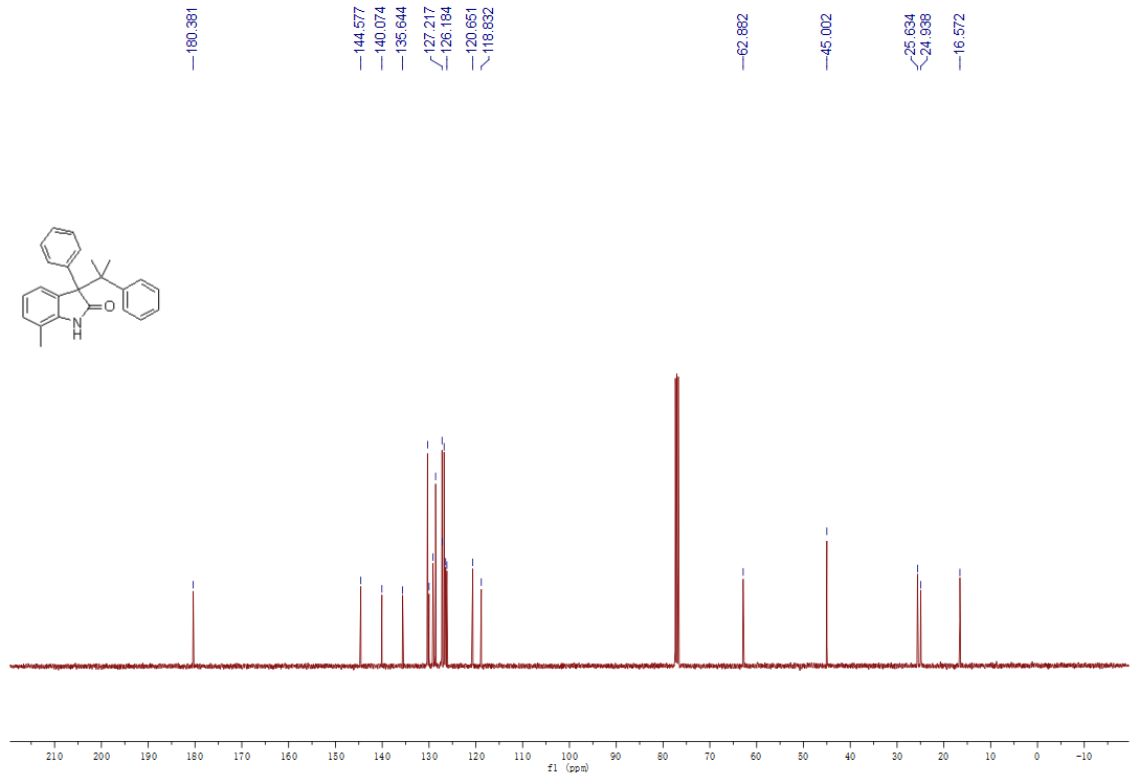
**$^{19}$F NMR spectrum of 3-phenyl-3-(2-phenylpropan-2-yl)-7-(trifluoromethyl)indolin-2-one (26):**



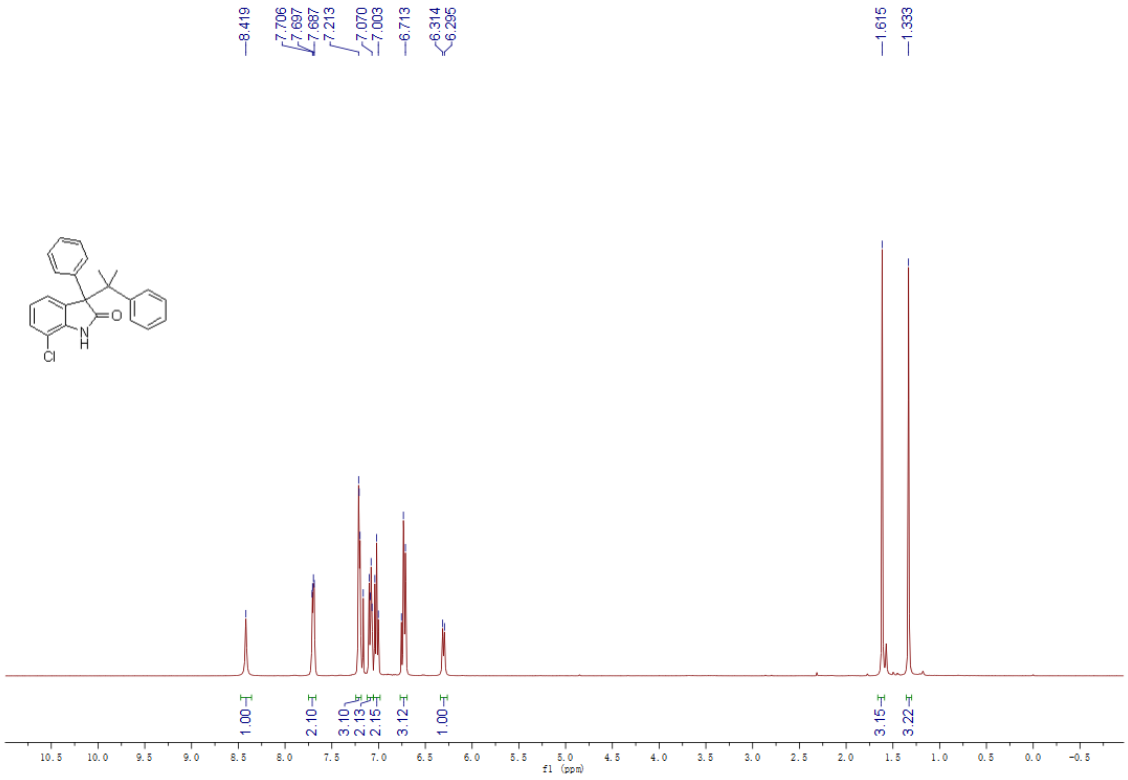
**$^{1}$H NMR spectrum of 7-methyl-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (27):**



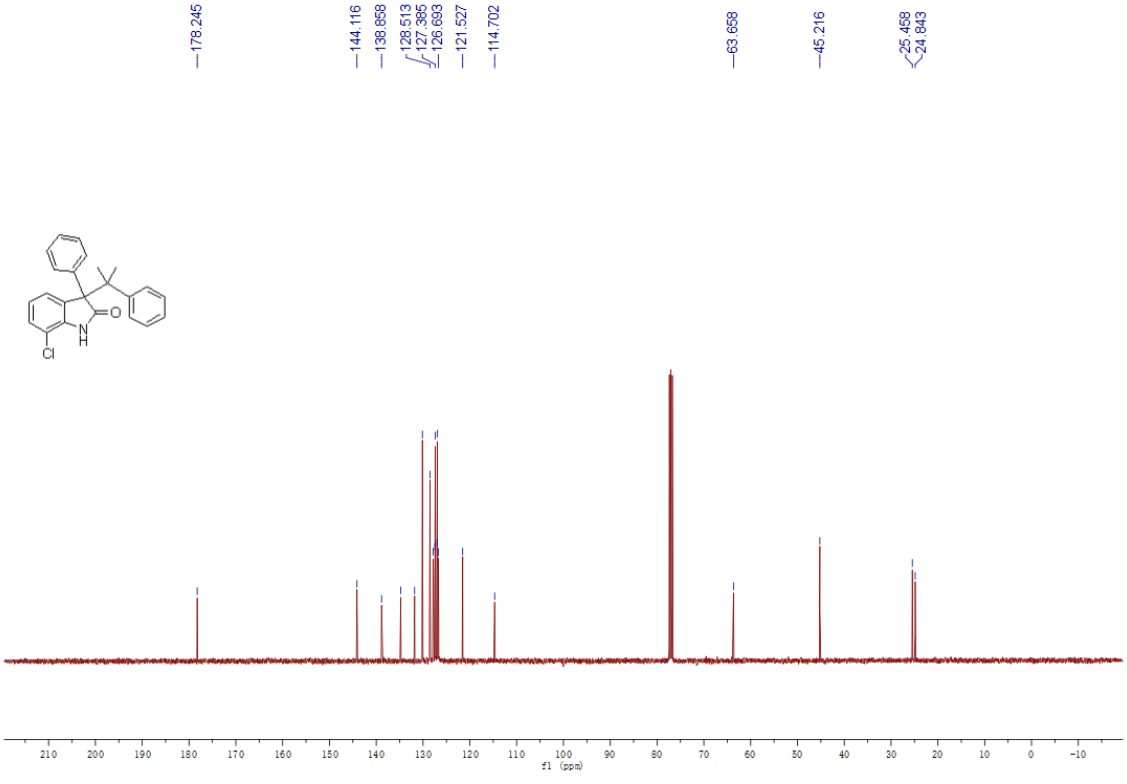

**$^{13}$C NMR spectrum of 7-methyl-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (27):**



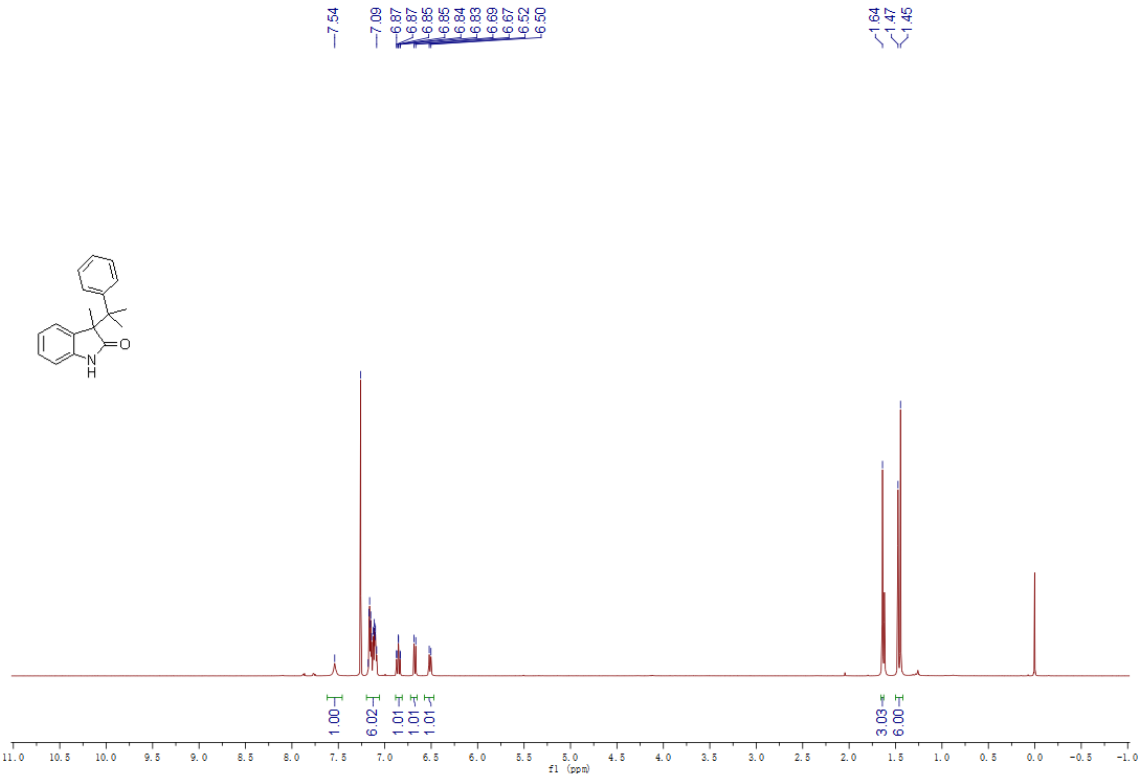
**$^{1}$H NMR spectrum of 7-chloro-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (28):**



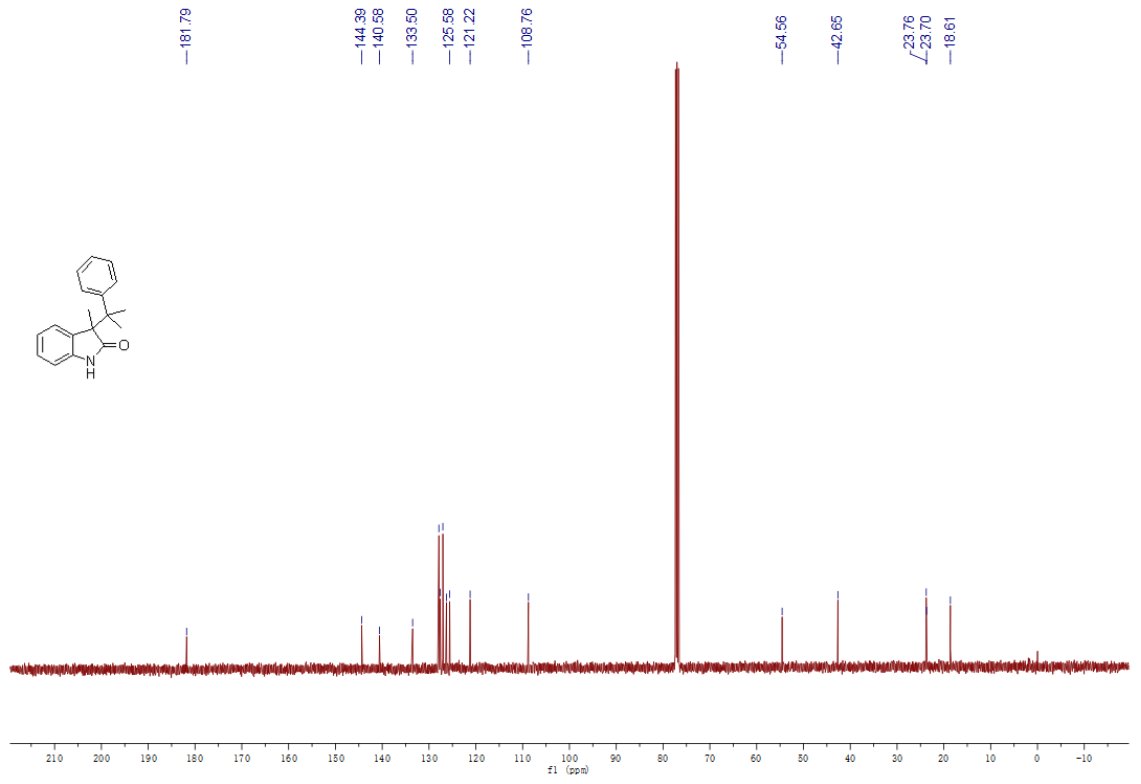

**$^{13}$C NMR spectrum of 7-chloro-3-phenyl-3-(2-phenylpropan-2-yl)indolin-2-one (28):**



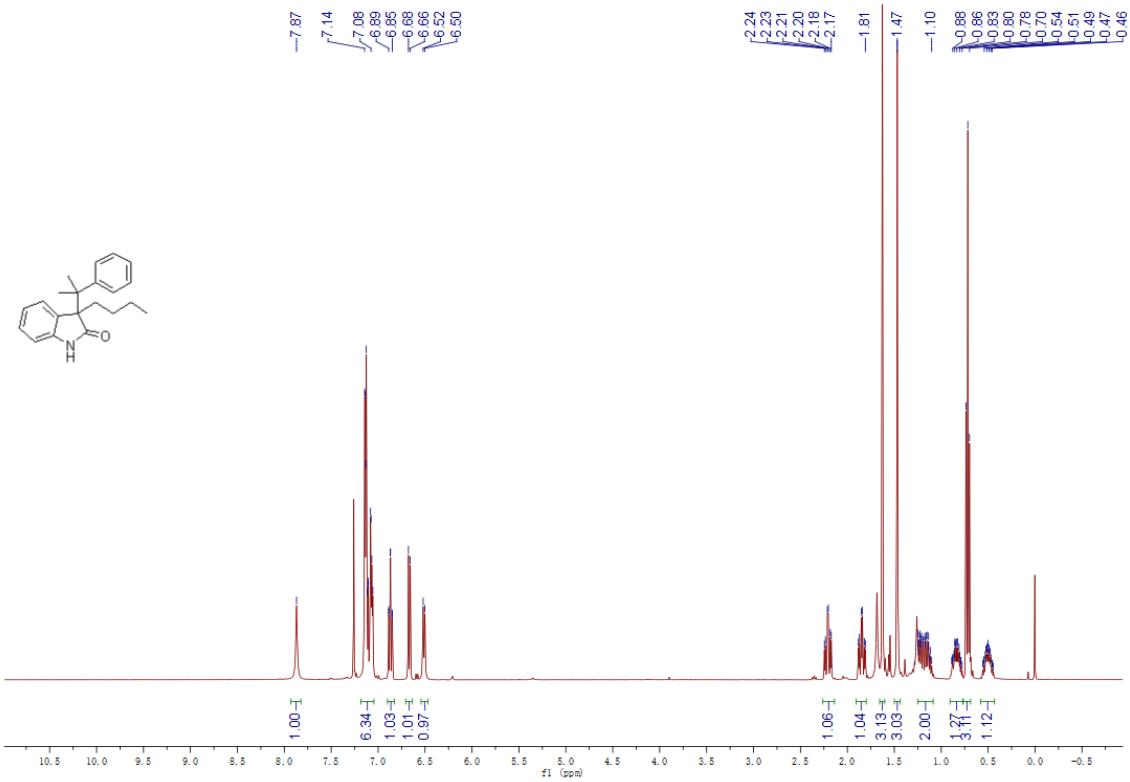
**$^{1}$H NMR spectrum of 3-methyl-3-(2-phenylpropan-2-yl)indolin-2-one (29):**



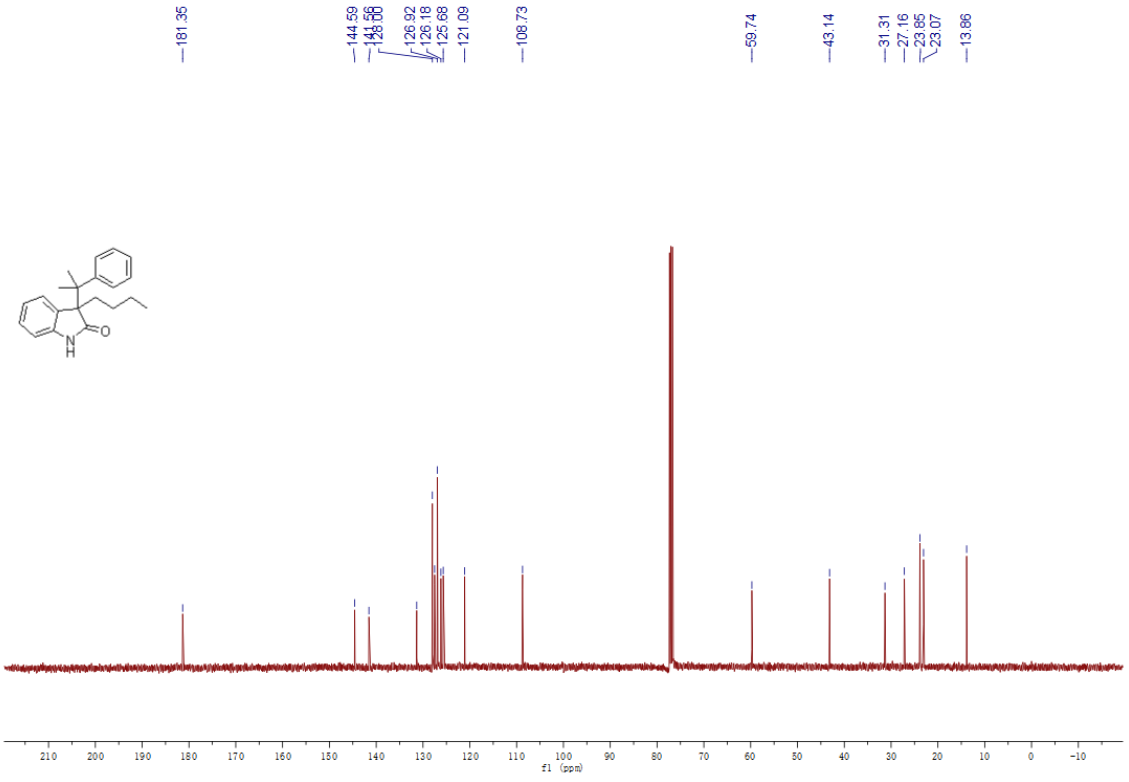

**$^{13}$C NMR spectrum of 3-methyl-3-(2-phenylpropan-2-yl)indolin-2-one (29):**



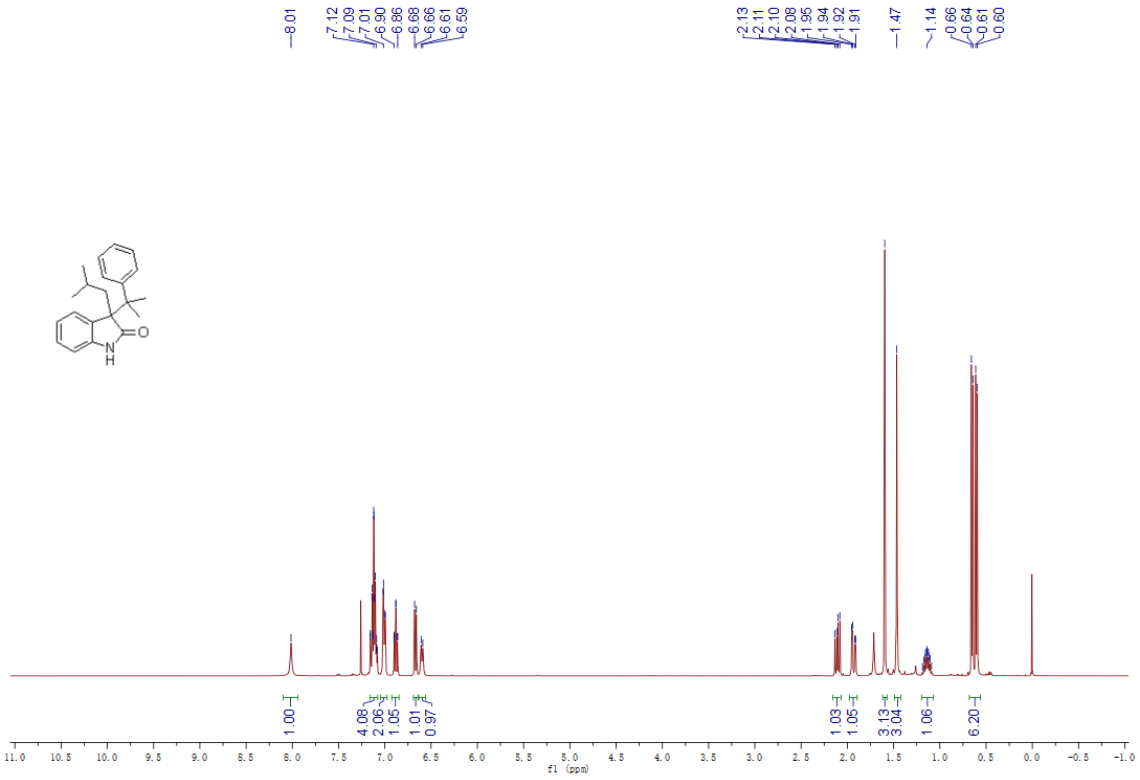
**$^{1}$H NMR spectrum of 3-butyl-3-(2-phenylpropan-2-yl)indolin-2-one (30):**



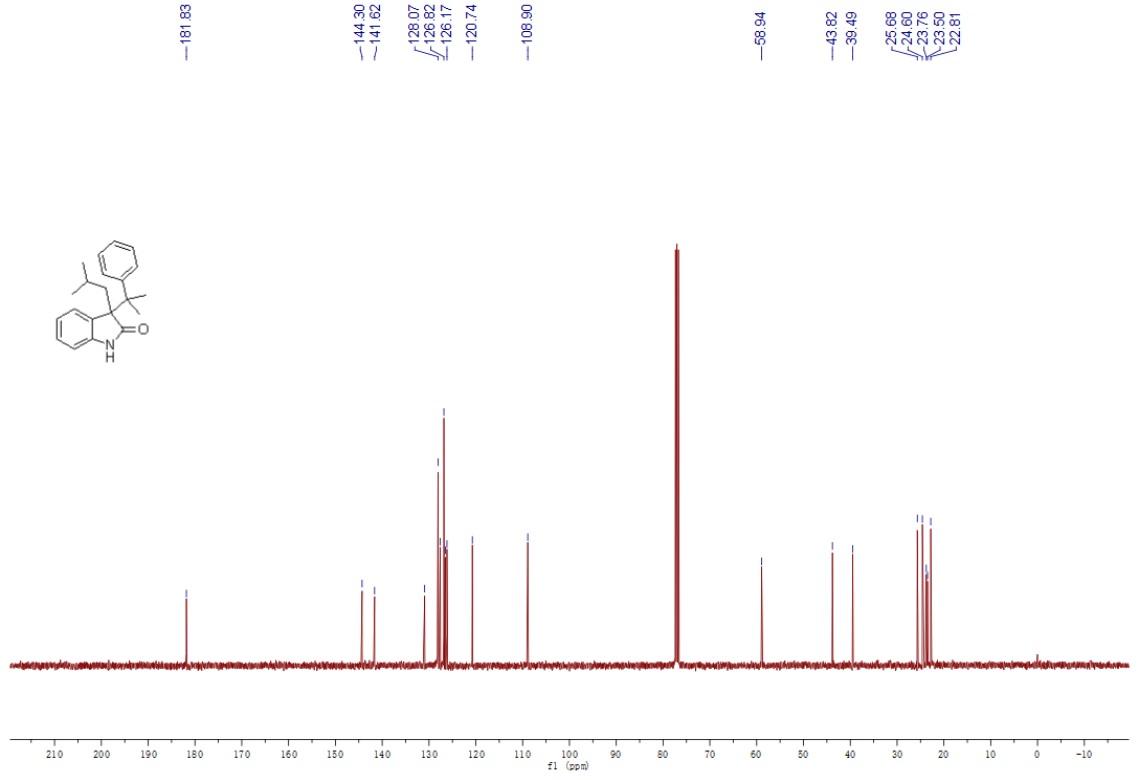

**$^{13}$C NMR spectrum of 3-butyl-3-(2-phenylpropan-2-yl)indolin-2-one (30):**



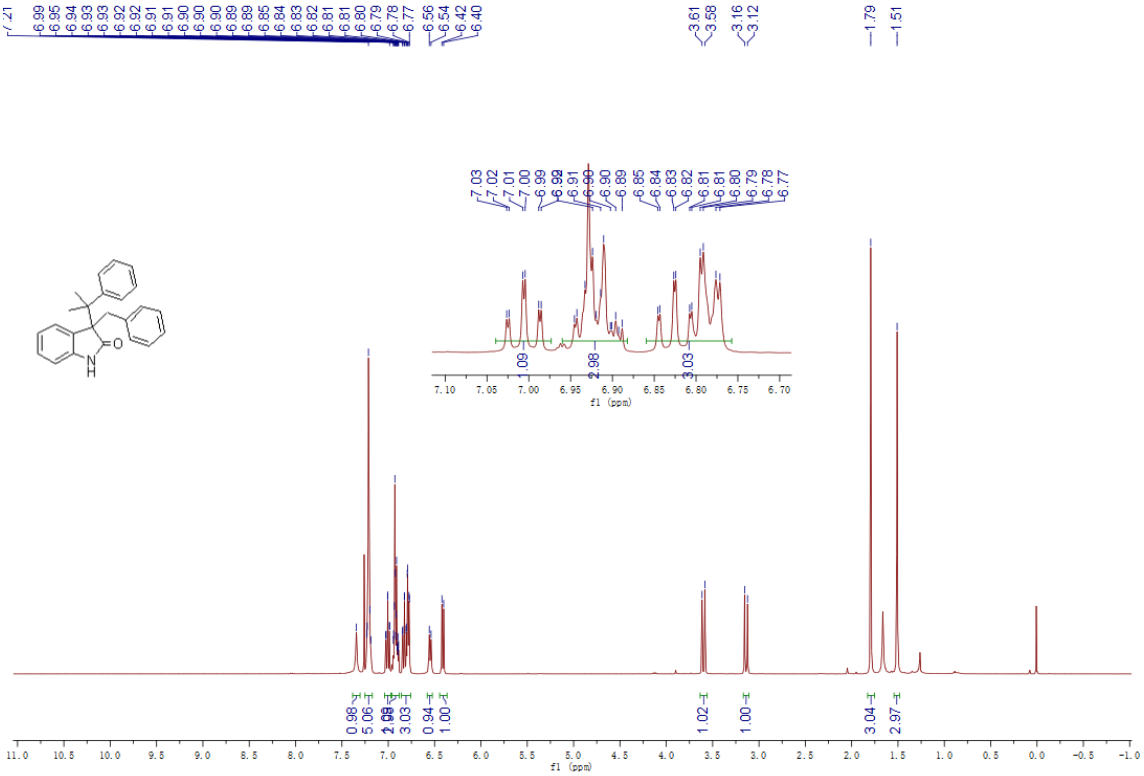
**$^{1}$H NMR spectrum of 3-isobutyl-3-(2-phenylpropan-2-yl)indolin-2-one (31):**



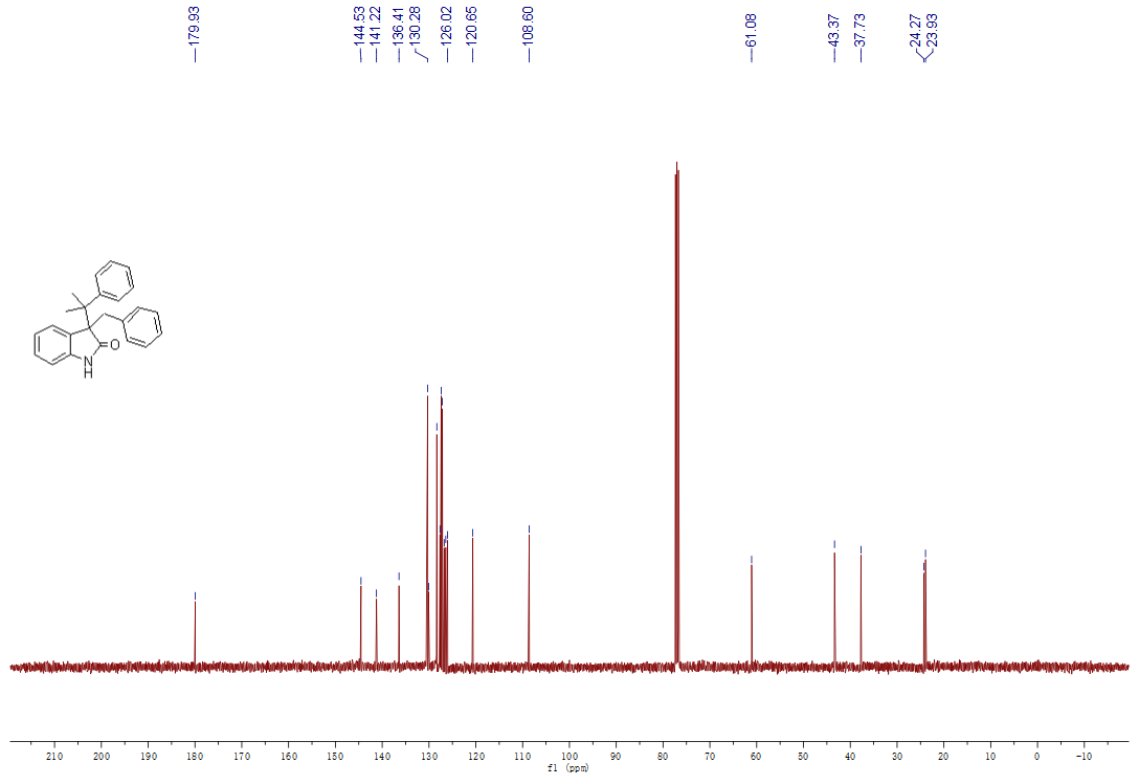

**$^{13}$C NMR spectrum of 3-isobutyl-3-(2-phenylpropan-2-yl)indolin-2-one (31):**



**$^{1}$H NMR spectrum of 3-benzyl-3-(2-phenylpropan-2-yl)indolin-2-one (32):**

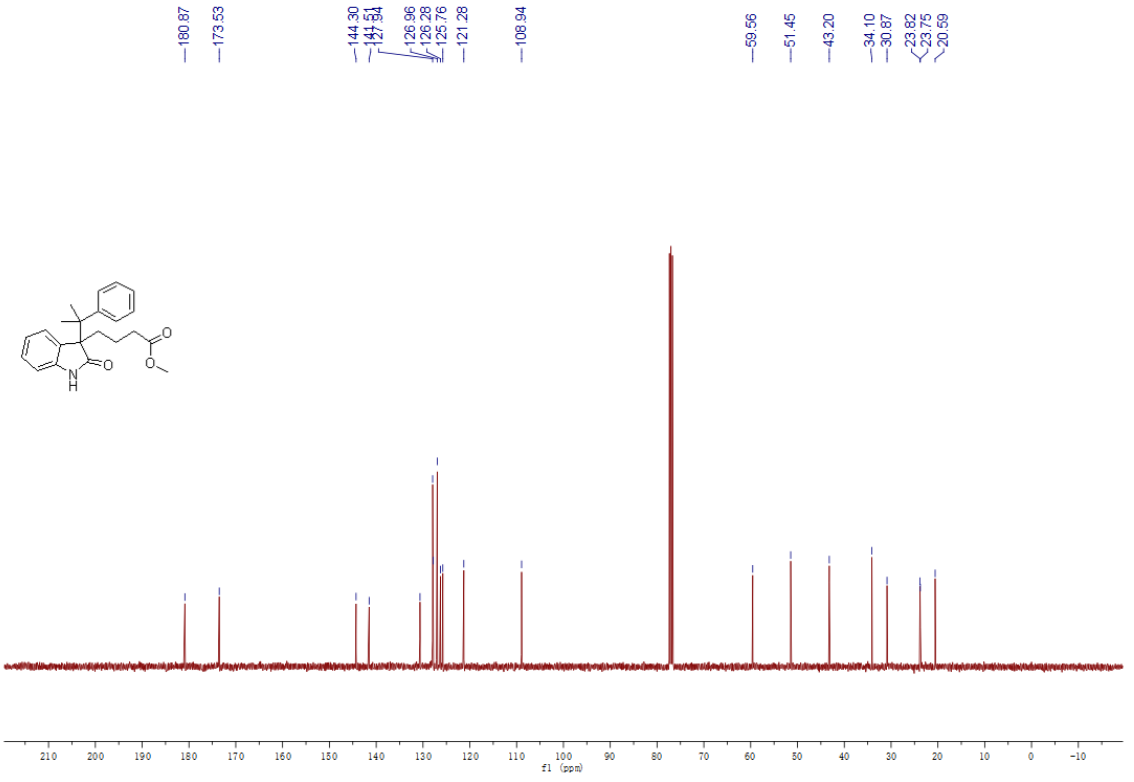


**$^{13}$C NMR spectrum of 3-benzyl-3-(2-phenylpropan-2-yl)indolin-2-one (32):**

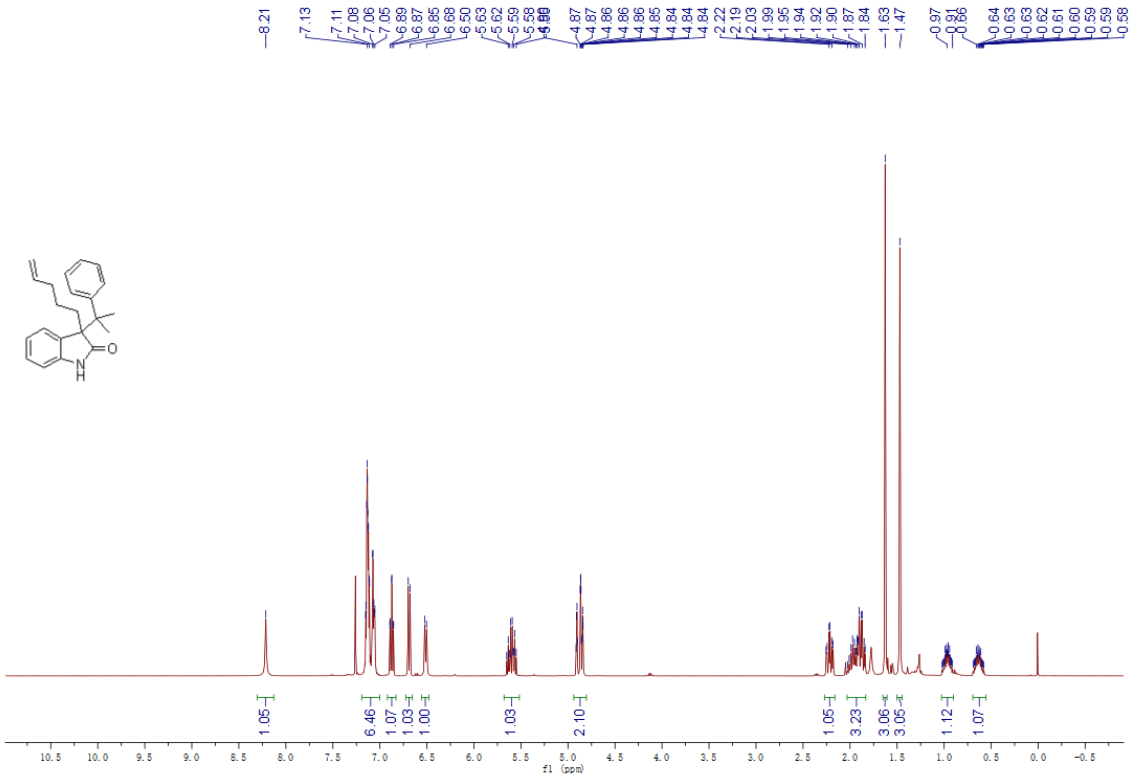


**$^{1}$H NMR spectrum of methyl 4-(2-oxo-3-(2-phenylpropan-2-yl)indolin-3-yl)butanoate (33):**

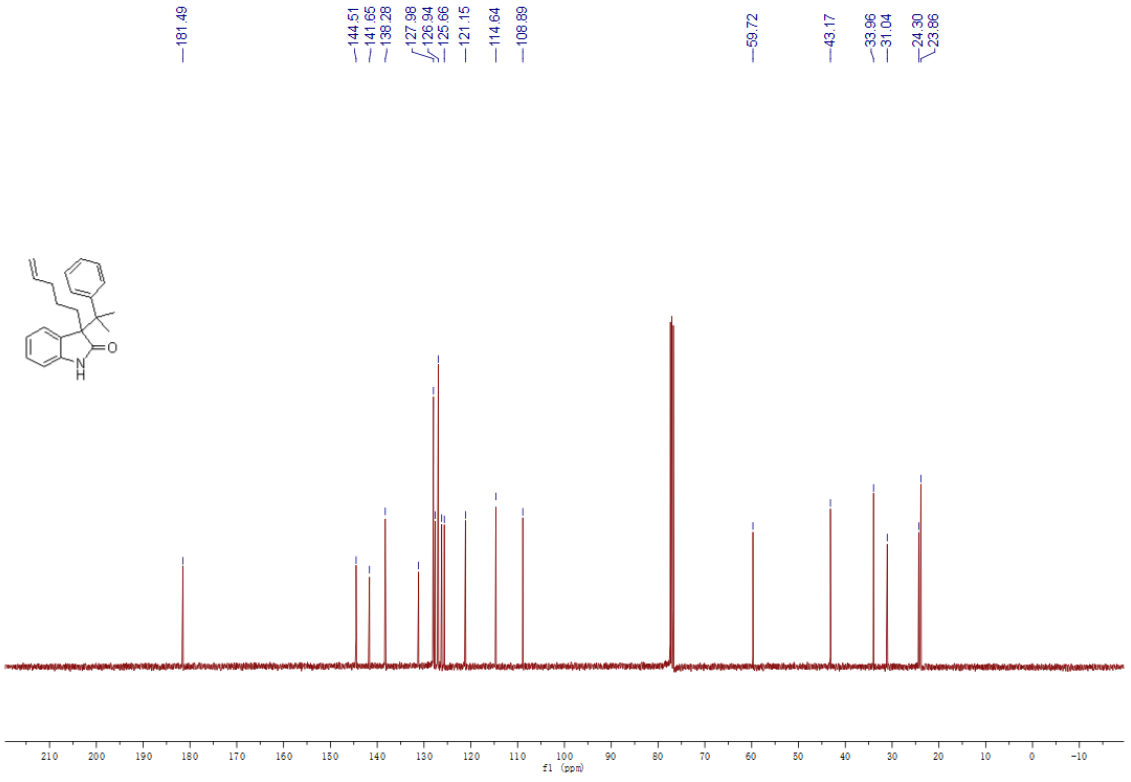

**$^{13}$C NMR spectrum of methyl 4-(2-oxo-3-(2-phenylpropan-2-yl)indolin-3-yl)butanoate (33):**



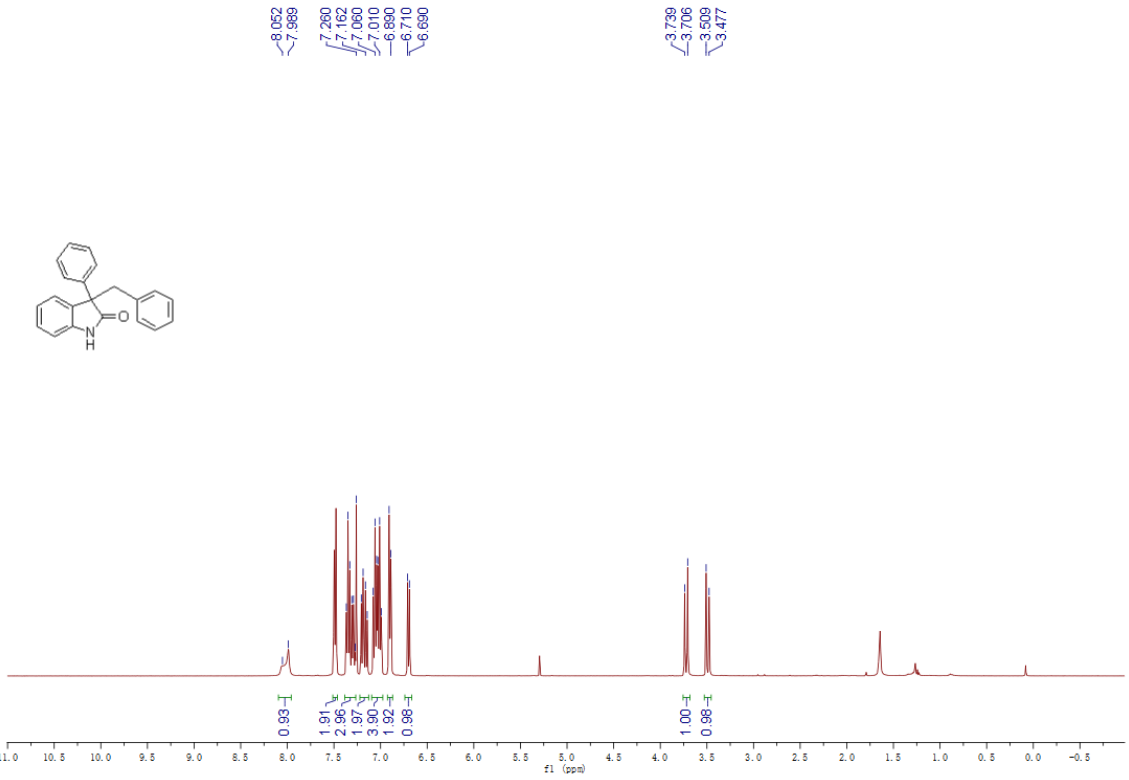
**$^{1}$H NMR spectrum of 3-(pent-4-en-1-yl)-3-(2-phenylpropan-2-yl)indolin-2-one (34):**



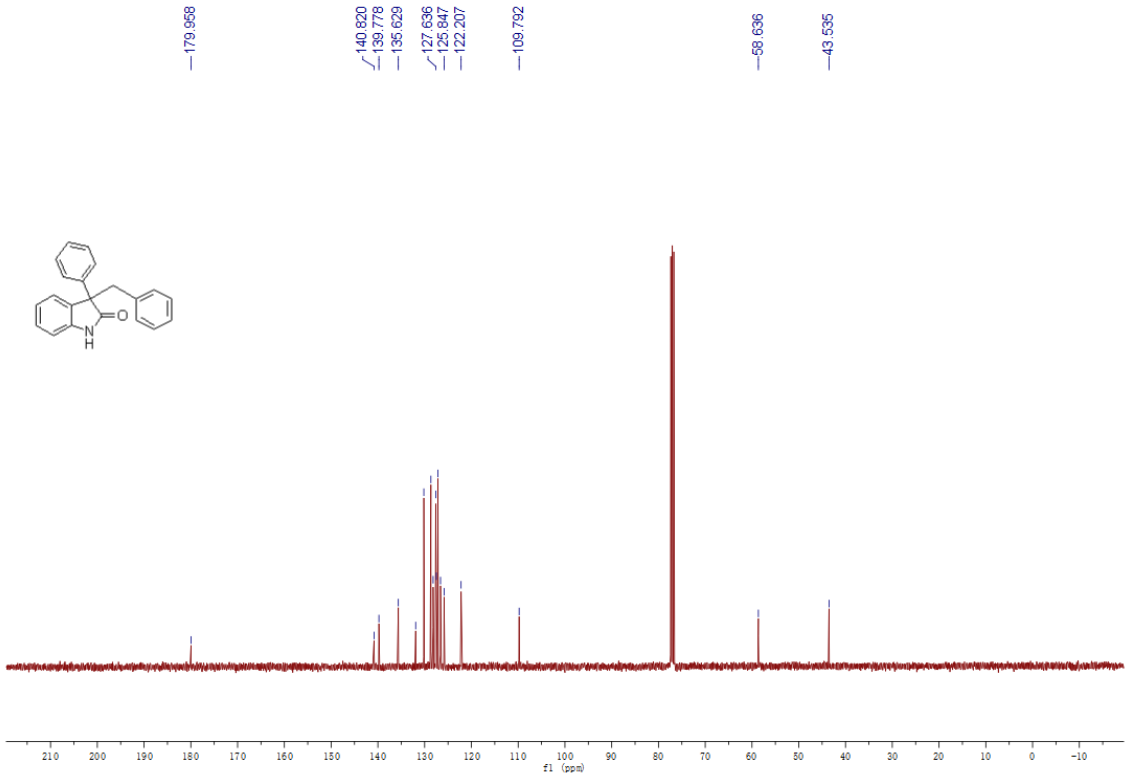

**$^{13}$C NMR spectrum of 3-(pent-4-en-1-yl)-3-(2-phenylpropan-2-yl)indolin-2-one (34):**



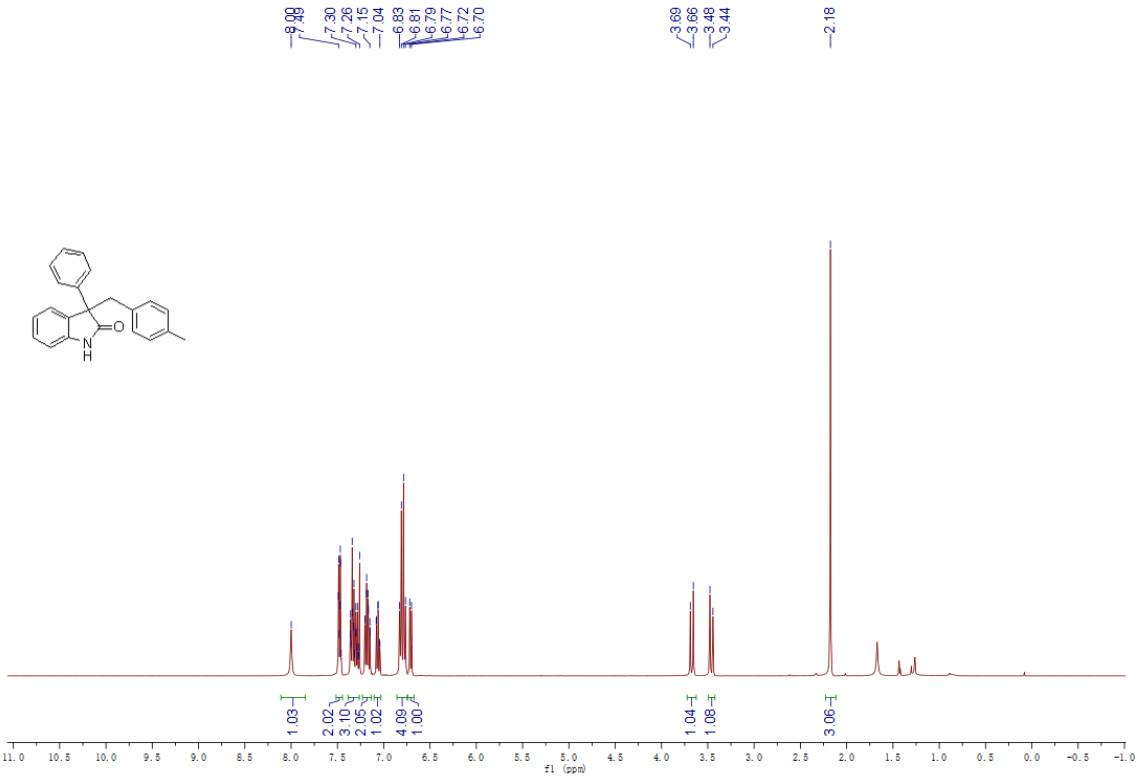
**$^{1}$H NMR spectrum of 3-benzyl-3-phenylindolin-2-one (35):**



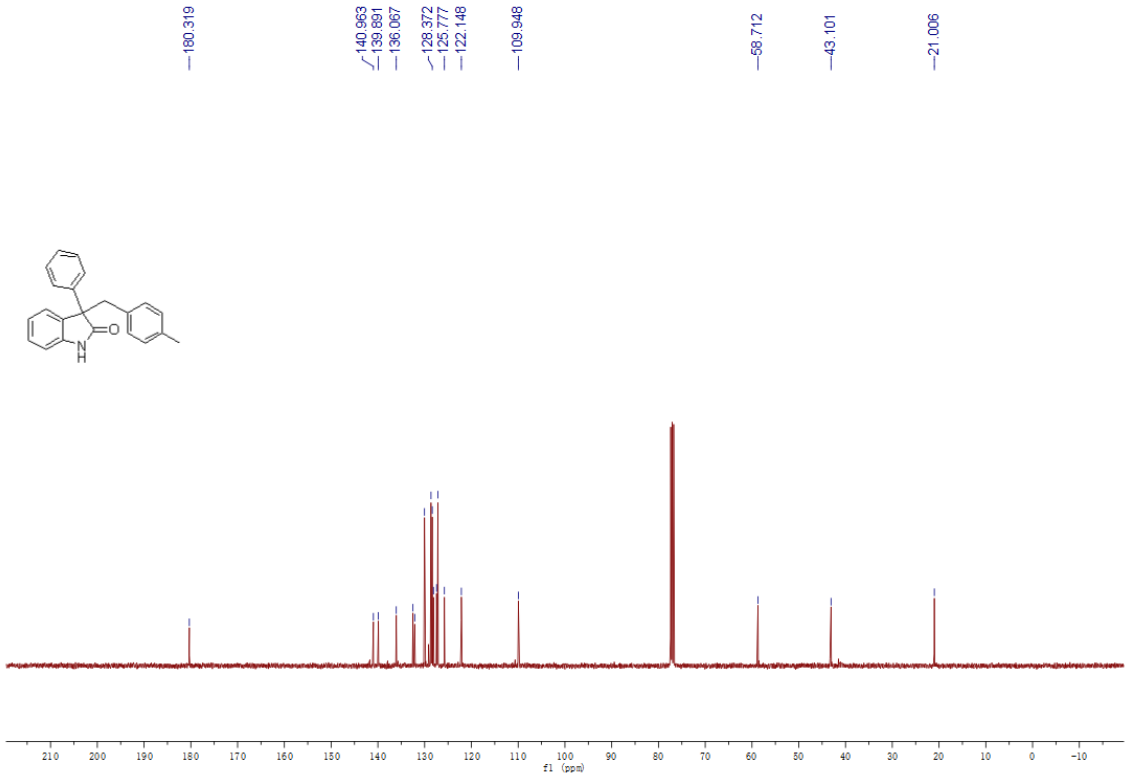

**$^{13}$C NMR spectrum of 3-benzyl-3-phenylindolin-2-one (35):**



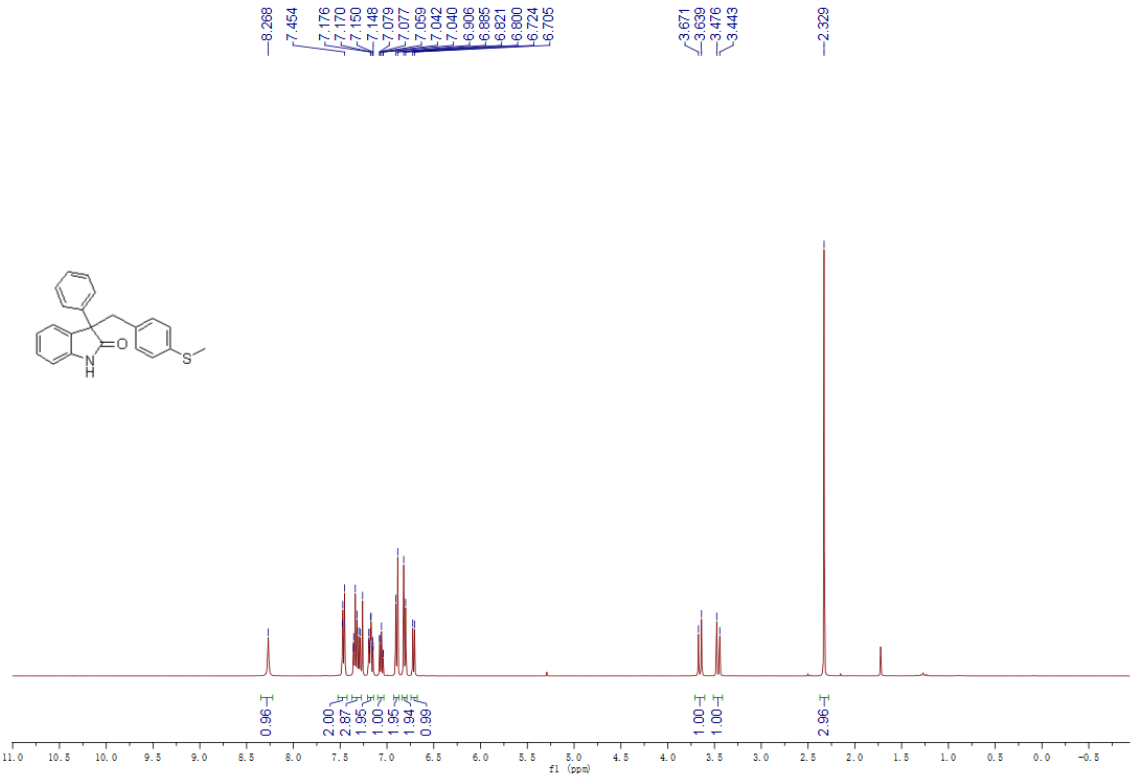
**$^{1}$H NMR spectrum of 3-(4-methylbenzyl)-3-phenylindolin-2-one (36):**



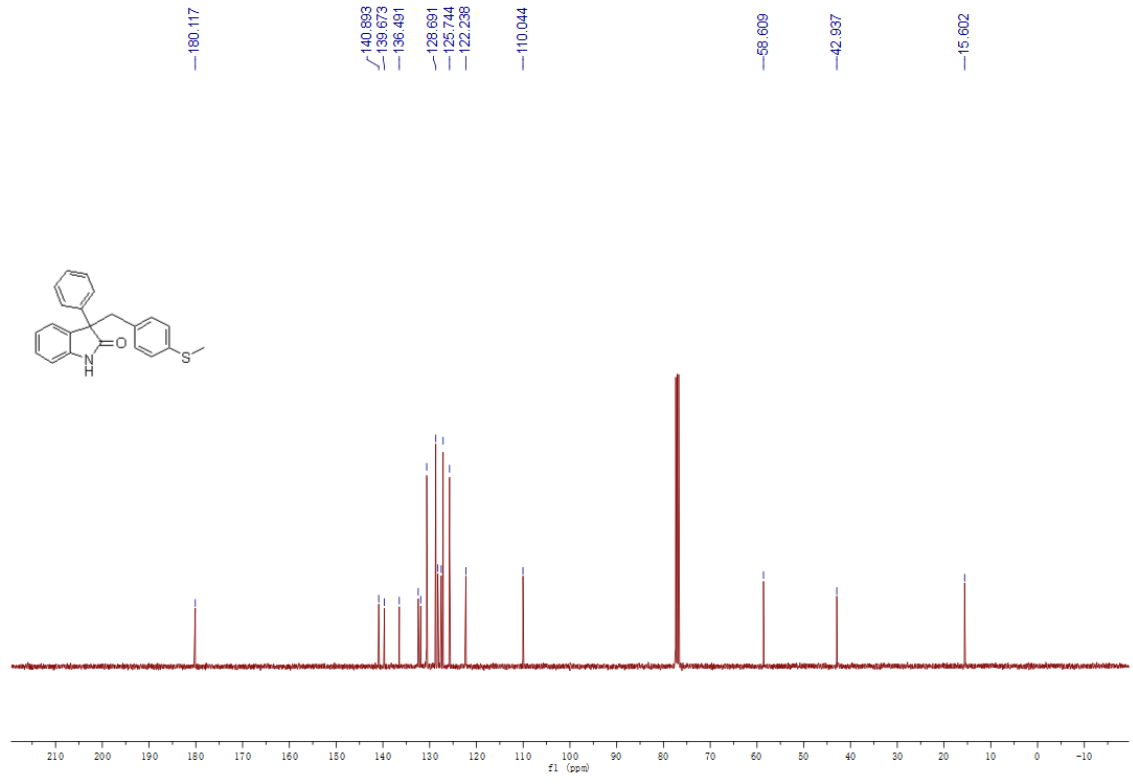

**$^{13}$C NMR spectrum of 3-(4-methylbenzyl)-3-phenylindolin-2-one (36):**



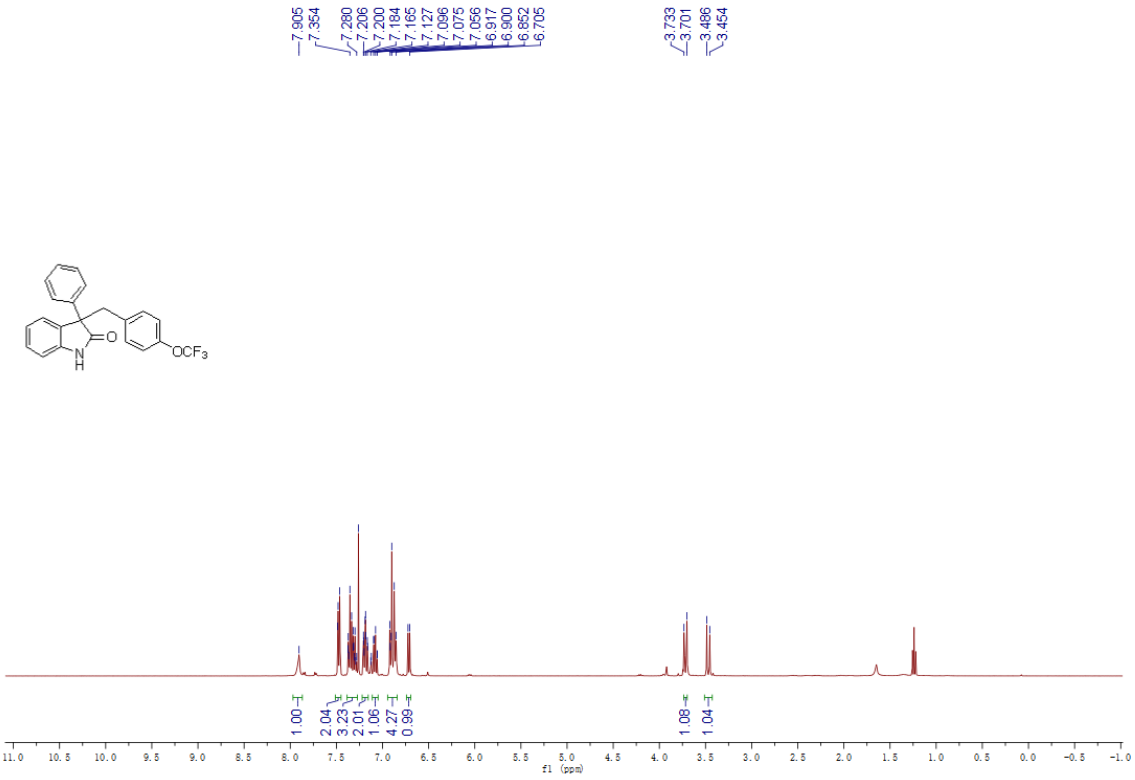
**$^{1}$H NMR spectrum of 3-(4-(methylthio)benzyl)-3-phenylindolin-2-one (37):**



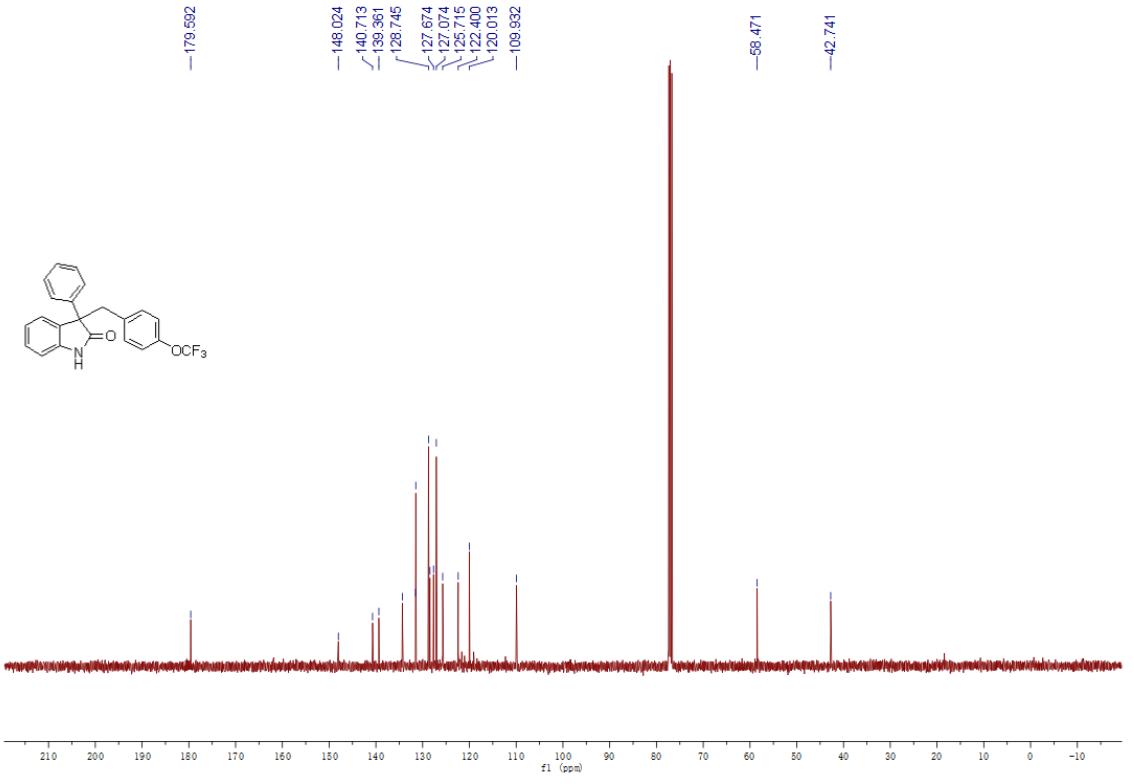

**$^{13}$C NMR spectrum of 3-(4-(methylthio)benzyl)-3-phenylindolin-2-one (37):**



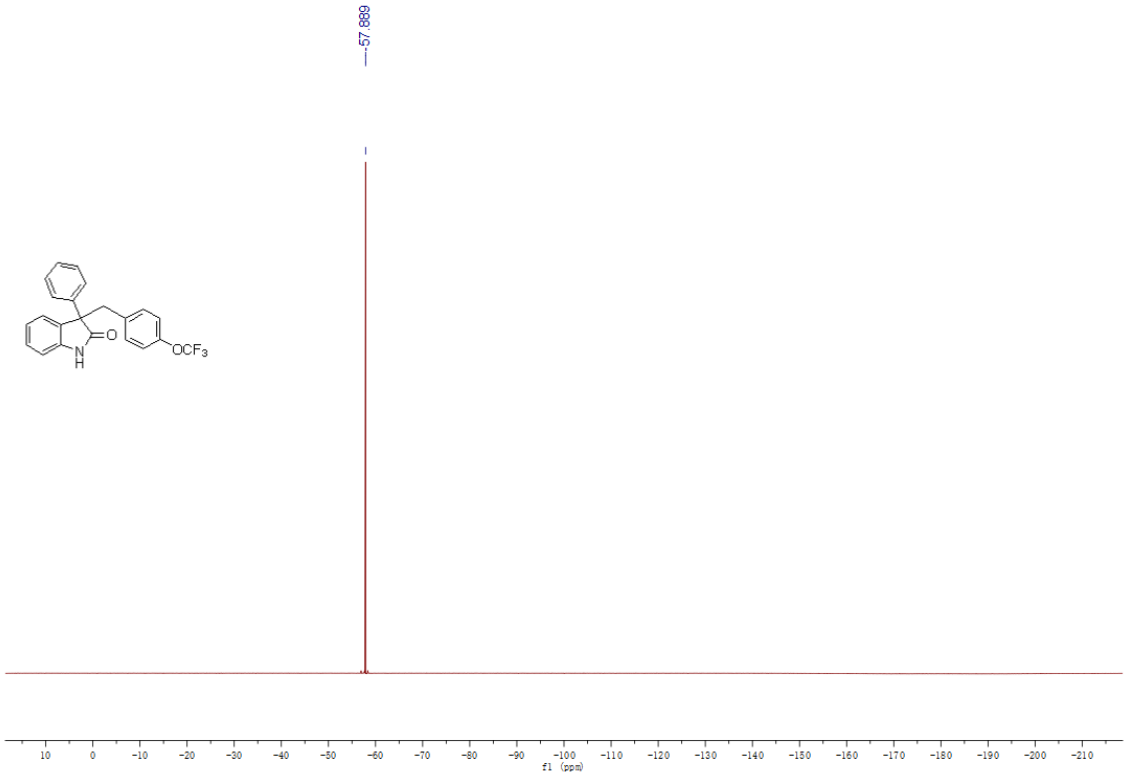
**$^{1}$H NMR spectrum of 3-phenyl-3-(4-(trifluoromethoxy)benzyl)indolin-2-one (38):**



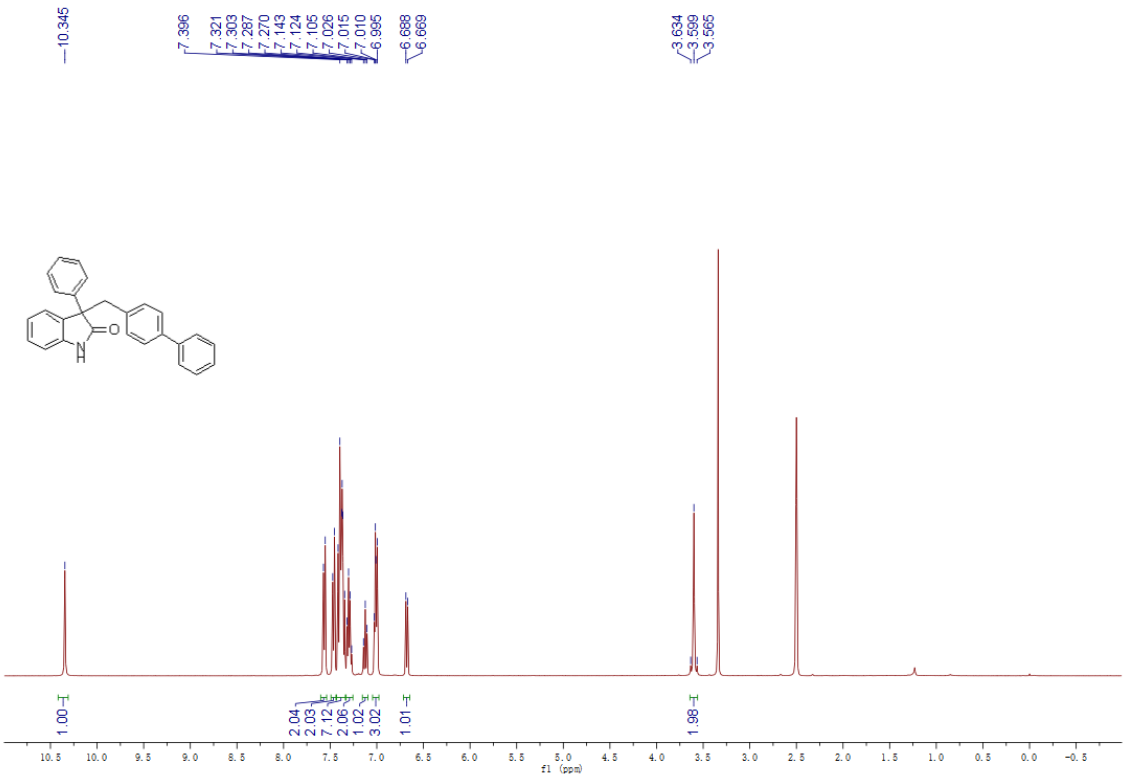

**$^{13}$C NMR spectrum of 3-phenyl-3-(4-(trifluoromethoxy)benzyl)indolin-2-one (38):**



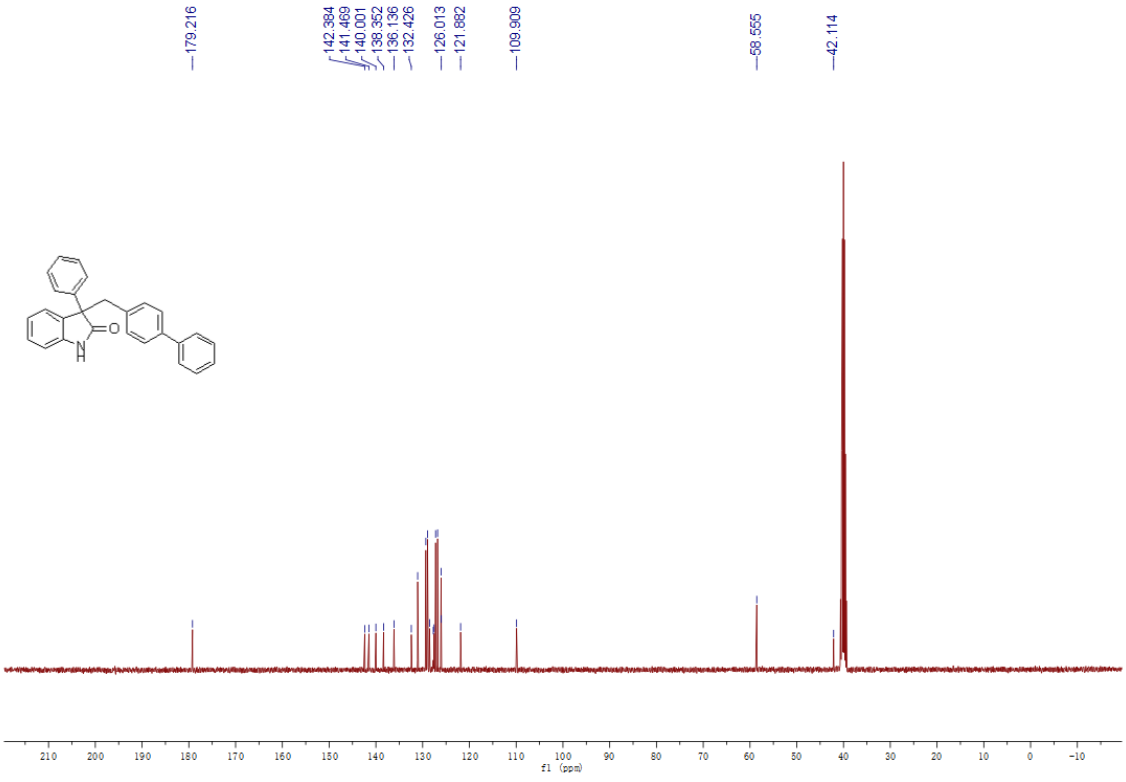
**$^{19}$F NMR spectrum of 3-phenyl-3-(4-(trifluoromethoxy)benzyl)indolin-2-one (38):**



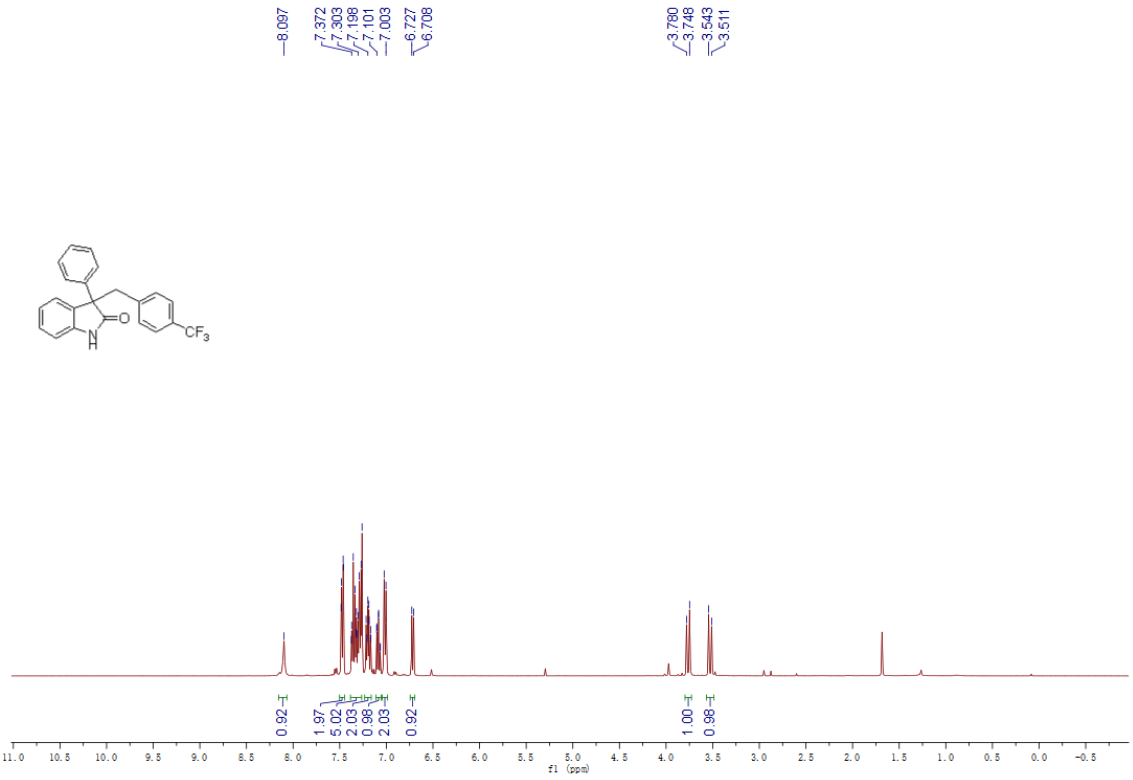
**$^{1}$H NMR spectrum of 3-([1,1'-biphenyl]-4-ylmethyl)-3-phenylindolin-2-one (39):**



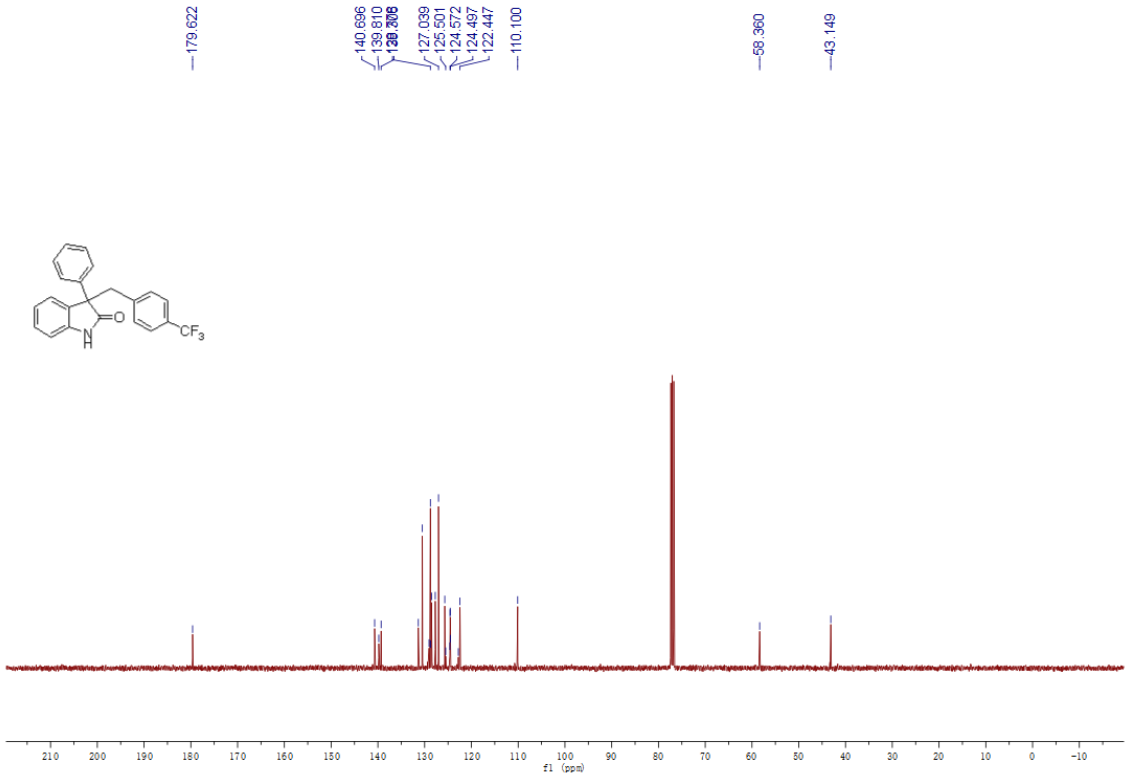

**$^{13}$C NMR spectrum of 3-([1,1'-biphenyl]-4-ylmethyl)-3-phenylindolin-2-one (39):**



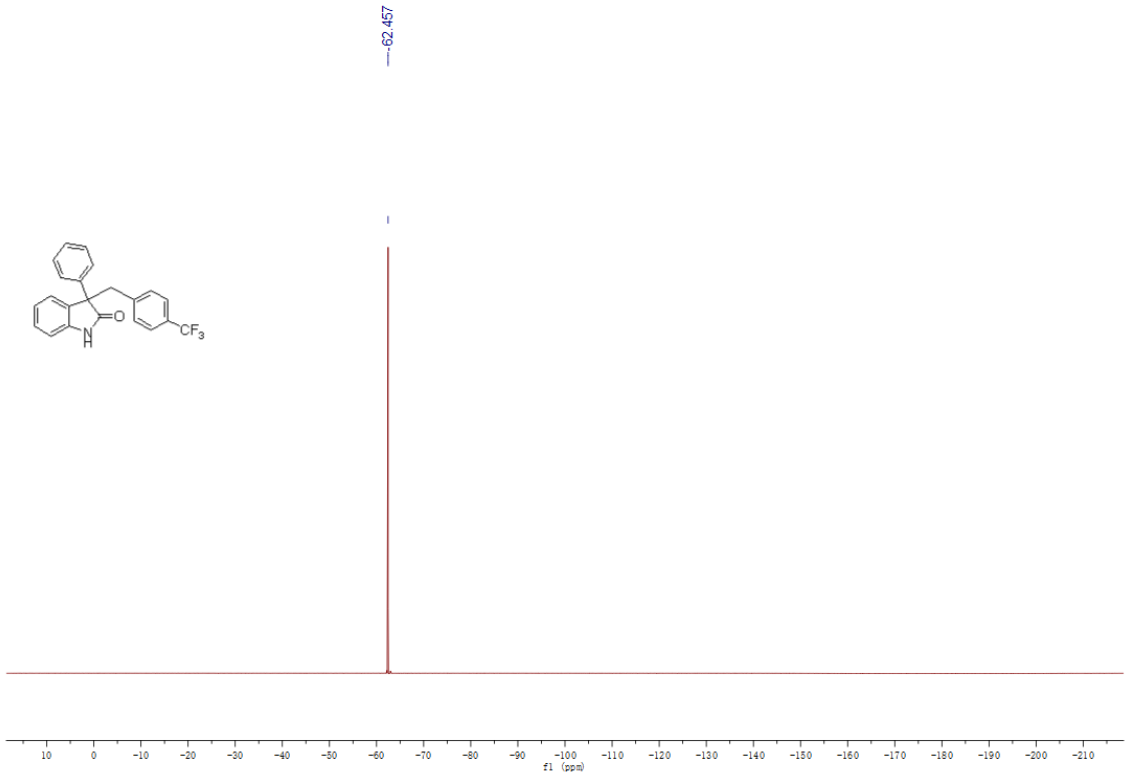
**$^{1}$H NMR spectrum of 3-phenyl-3-(4-(trifluoromethyl)benzyl)indolin-2-one (40):**



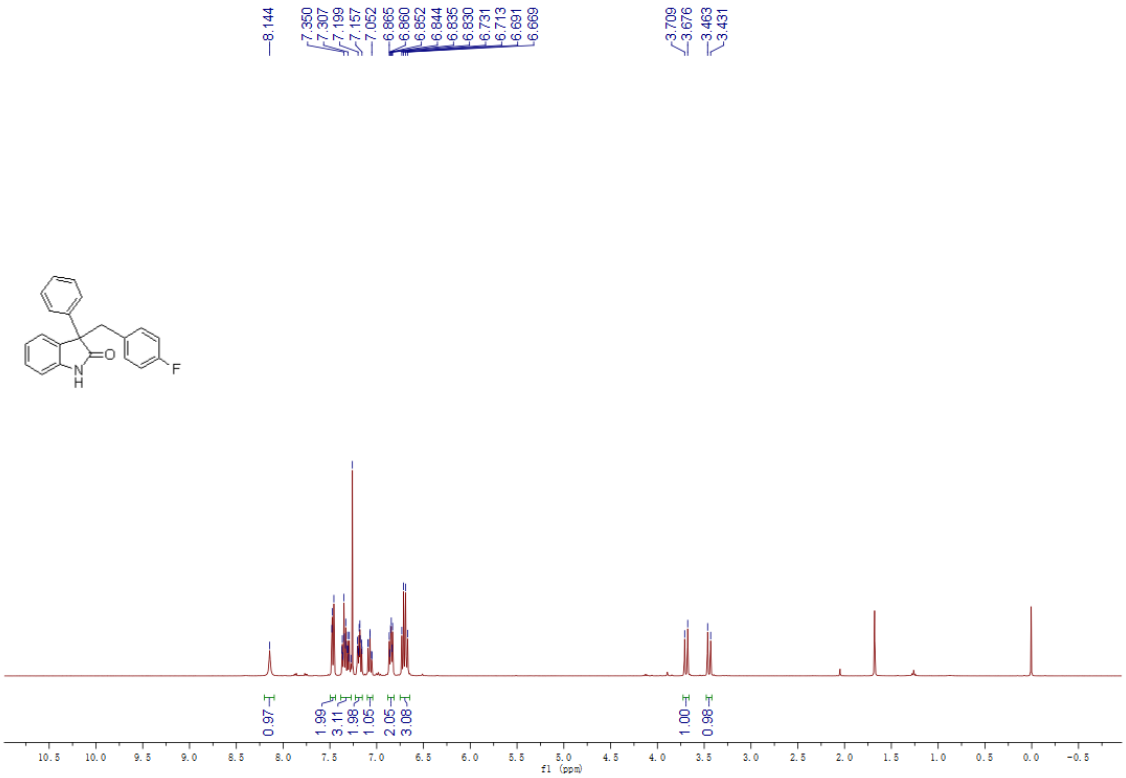

**$^{13}$C NMR spectrum of 3-phenyl-3-(4-(trifluoromethyl)benzyl)indolin-2-one (40):**



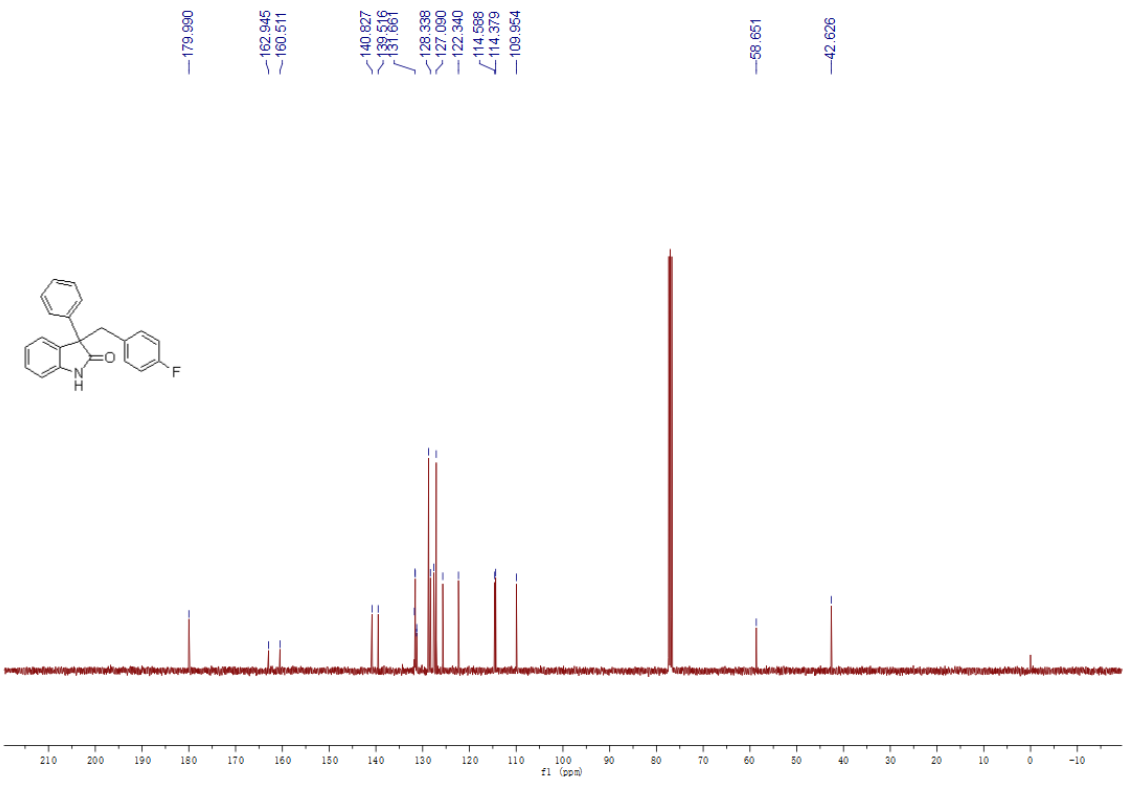
**$^{19}$F NMR spectrum of 3-phenyl-3-(4-(trifluoromethyl)benzyl)indolin-2-one (40):**



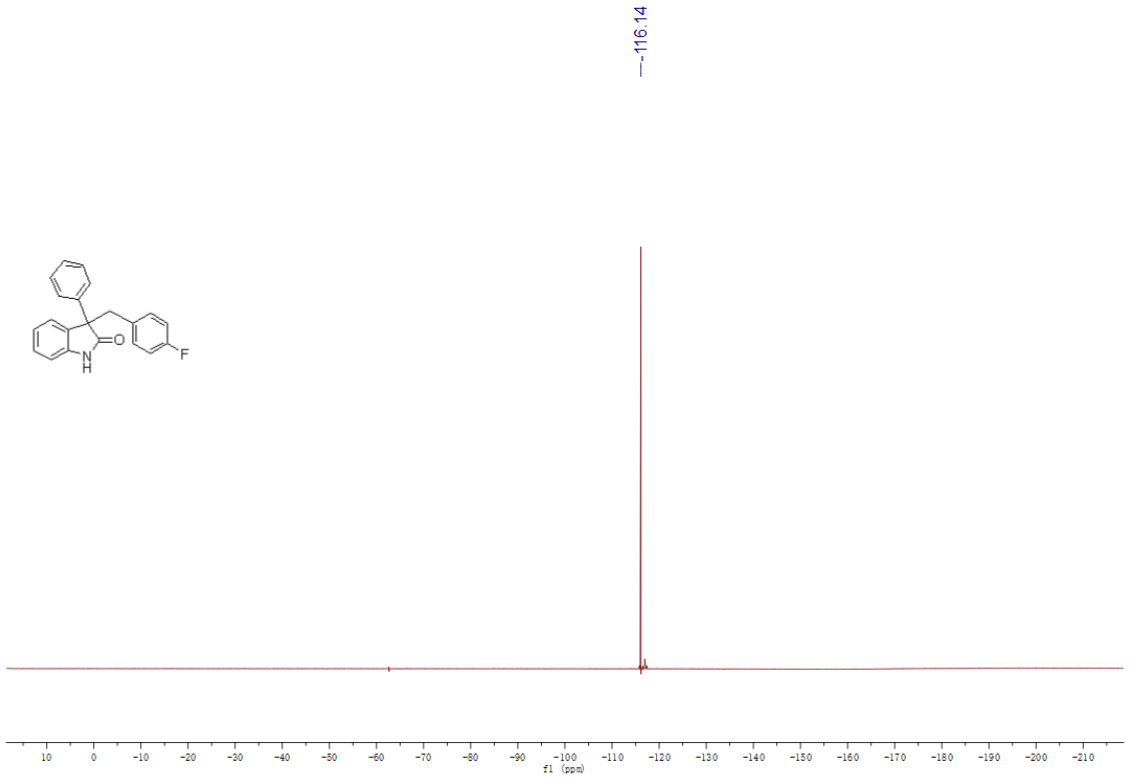
**$^{1}$H NMR spectrum of 3-(4-fluorobenzyl)-3-phenylindolin-2-one (41):**



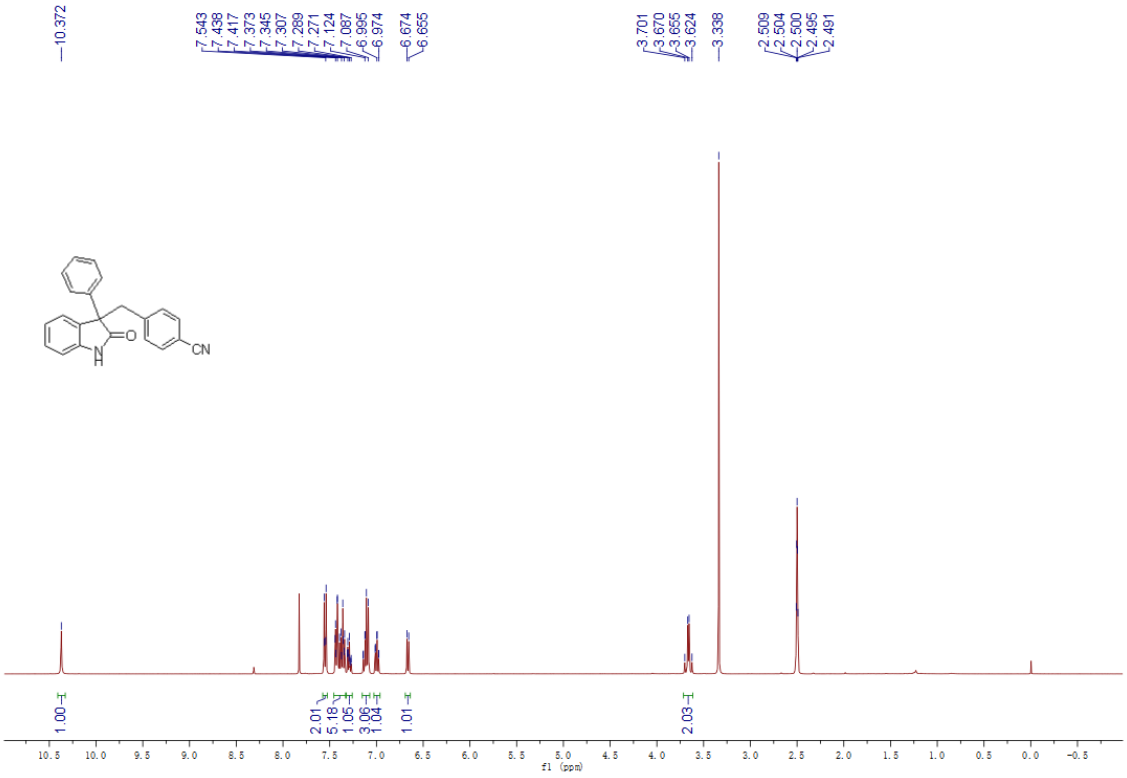

**$^{13}$C NMR spectrum of 3-(4-fluorobenzyl)-3-phenylindolin-2-one (41):**



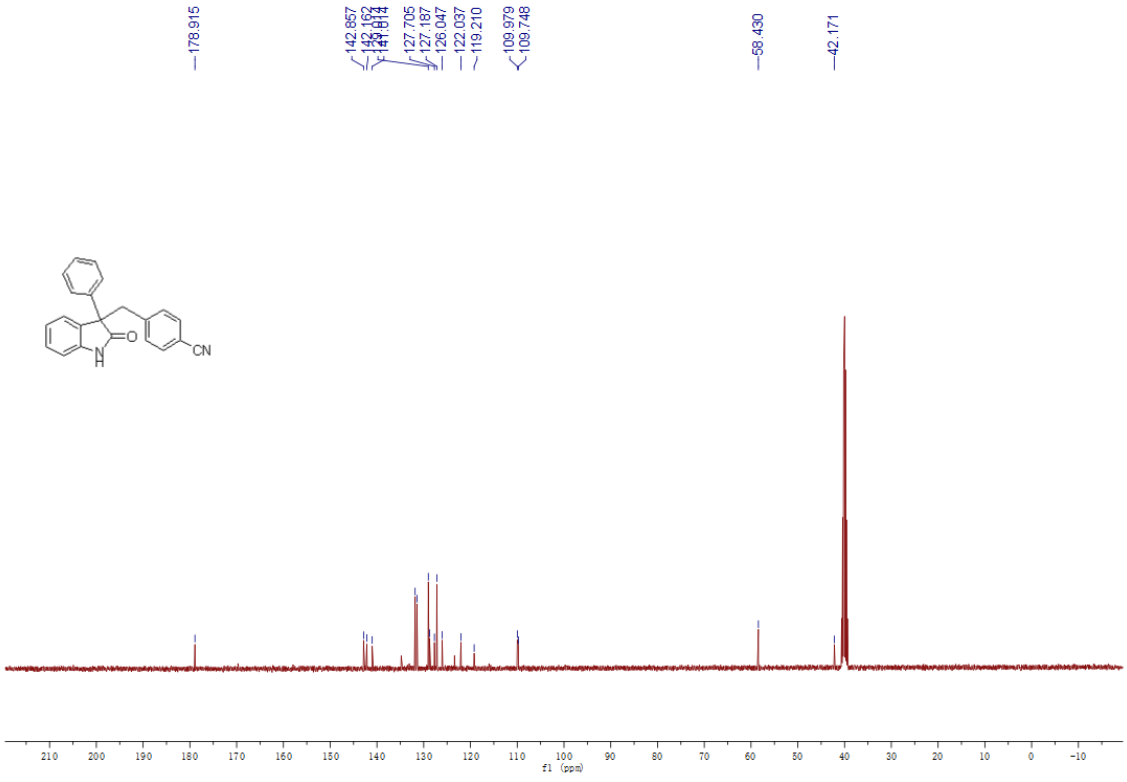
**$^{19}$F NMR spectrum of 3-(4-fluorobenzyl)-3-phenylindolin-2-one (41):**



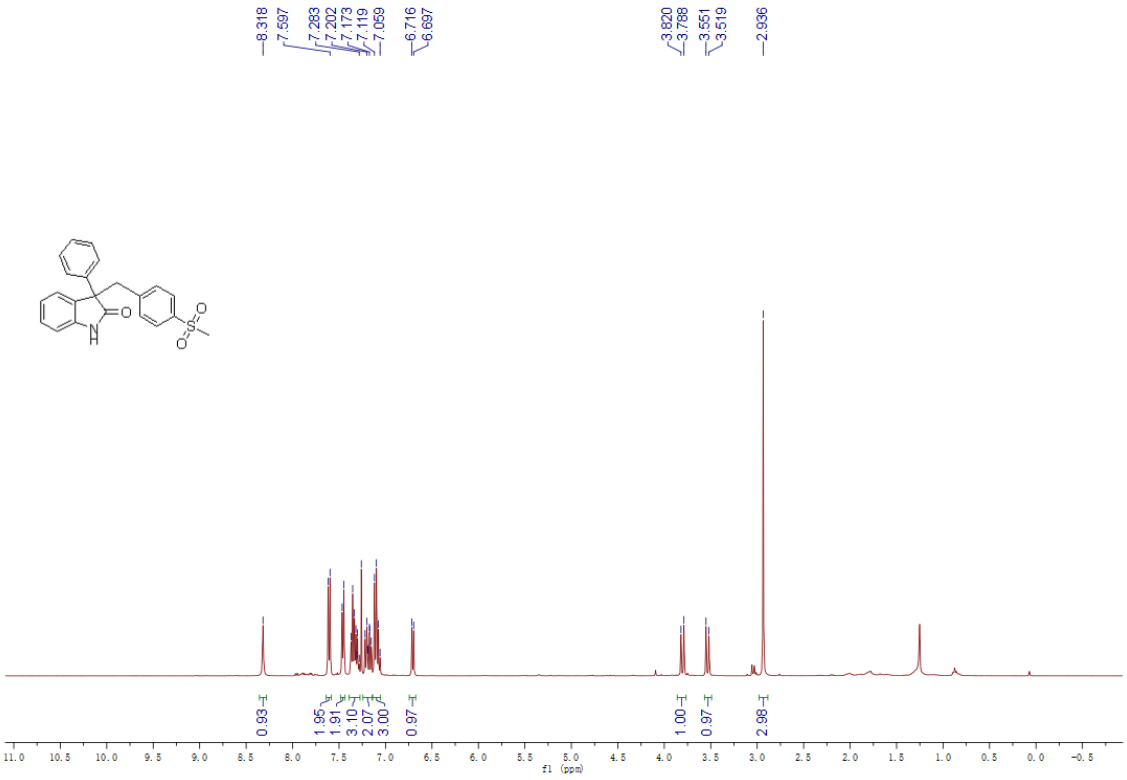
**$^{1}$H NMR spectrum of 4-((2-oxo-3-phenylindolin-3-yl)methyl)benzonitrile (42):**



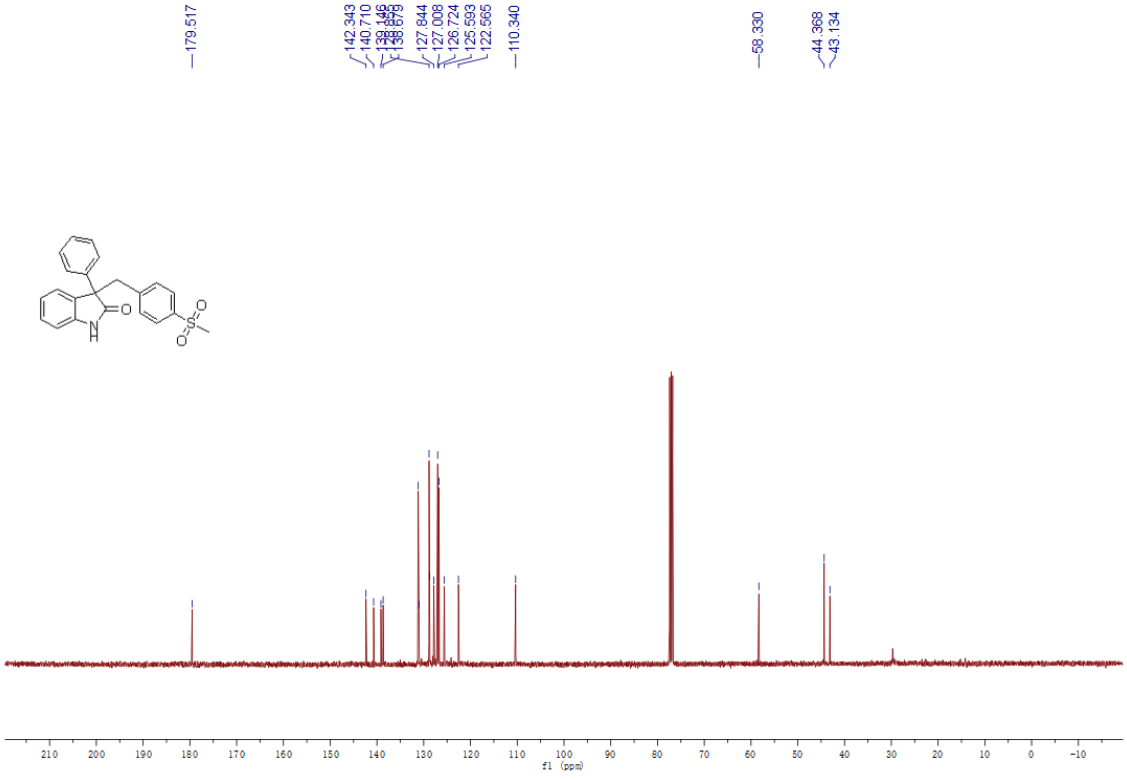

**$^{13}$C NMR spectrum of 4-((2-oxo-3-phenylindolin-3-yl)methyl)benzonitrile (42):**



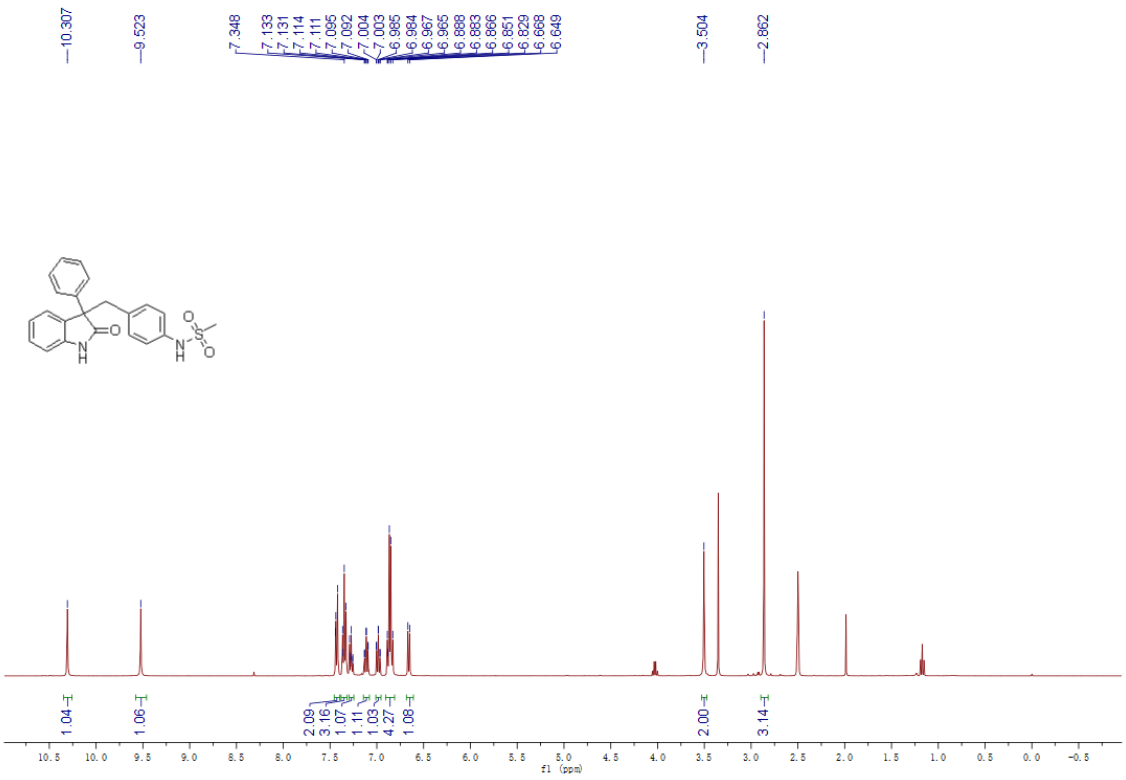
**$^{1}$H NMR spectrum of 3-(4-(methylsulfonyl)benzyl)-3-phenylindolin-2-one (43):**



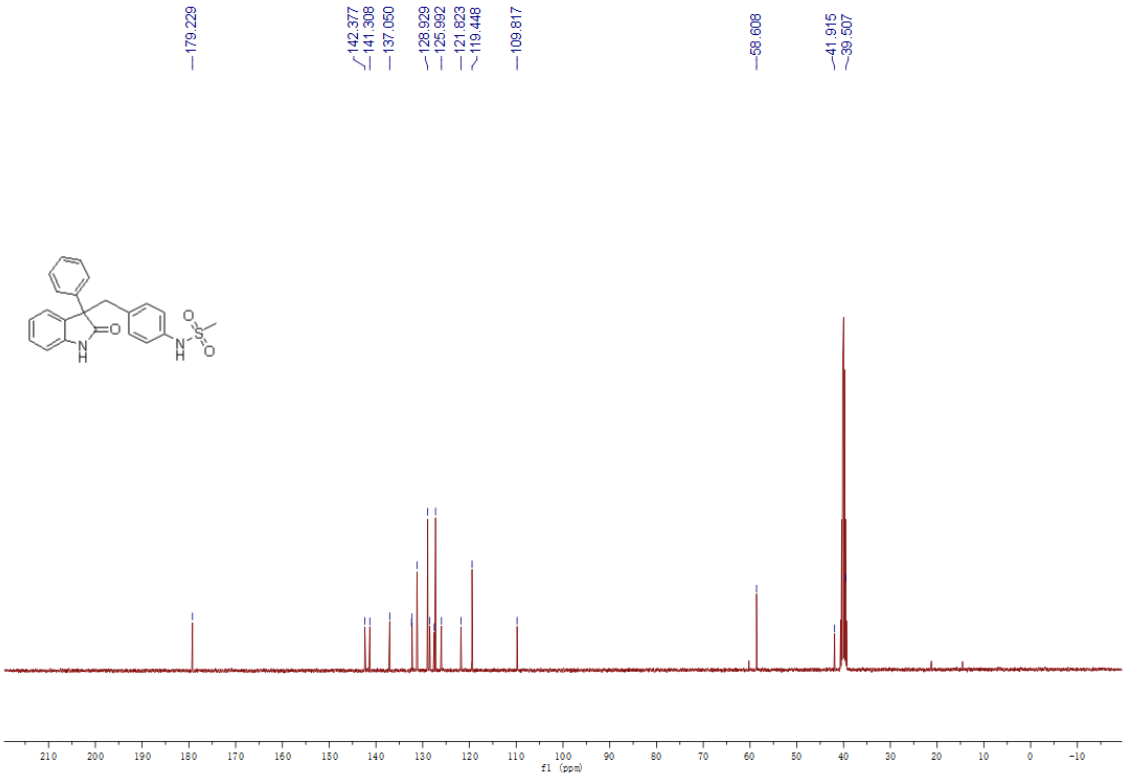

**$^{13}$C NMR spectrum of 3-(4-(methylsulfonyl)benzyl)-3-phenylindolin-2-one (43):**



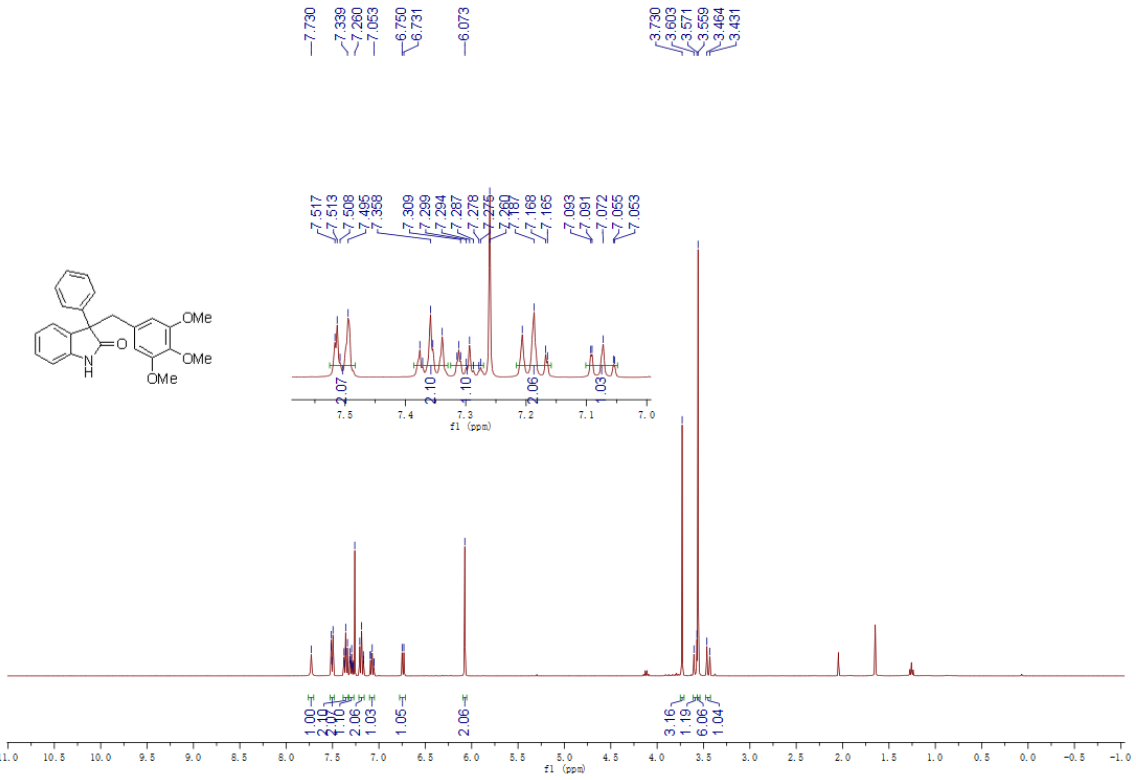
**$^{1}$H NMR spectrum of *N*-(4-((2-oxo-3-phenylindolin-3-yl)methyl)phenyl)methanesulfonamide (44) :**



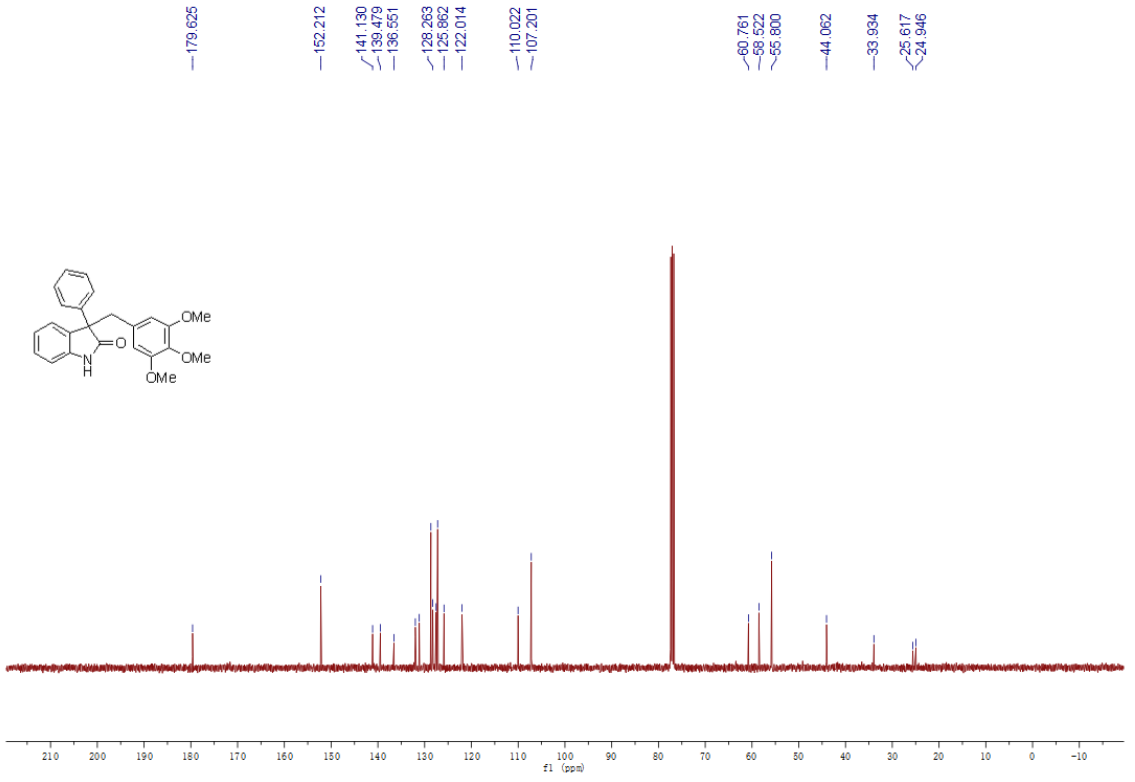

**$^{13}$C NMR spectrum of *N*-(4-((2-oxo-3-phenylindolin-3-yl)methyl)phenyl)methanesulfonamide (44) :**



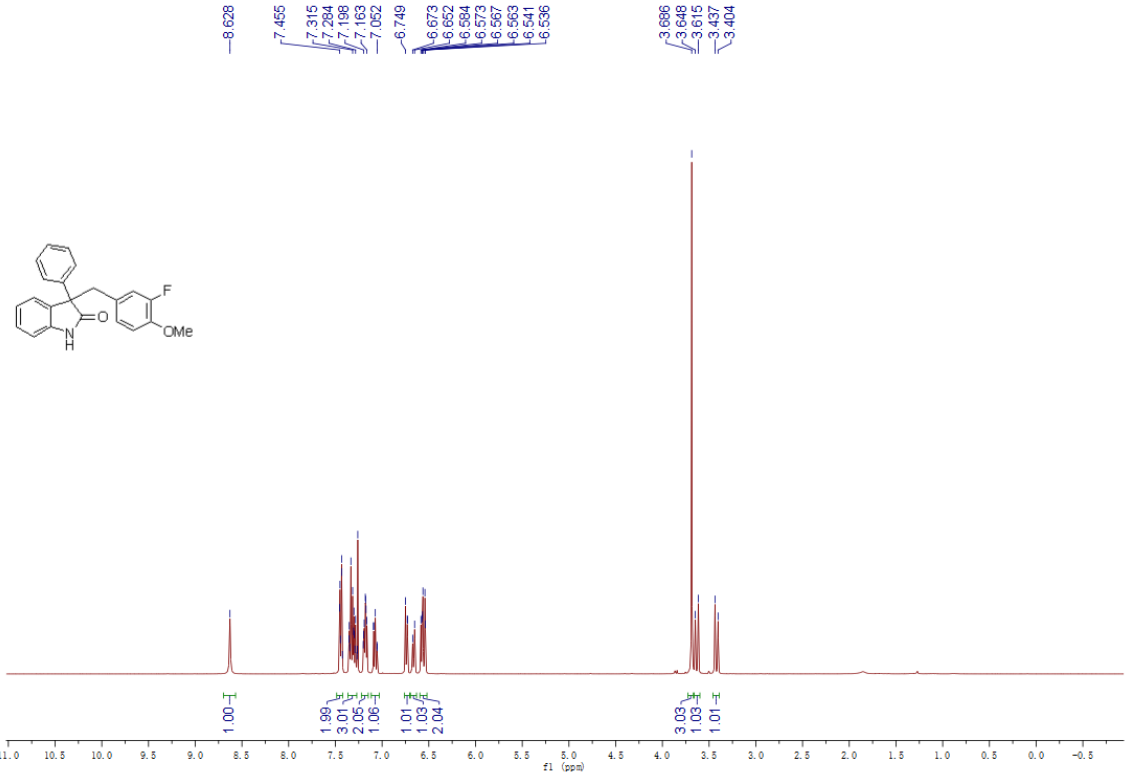
**$^{1}$H NMR spectrum of 3-phenyl-3-(3,4,5-trimethoxybenzyl)indolin-2-one (45):**



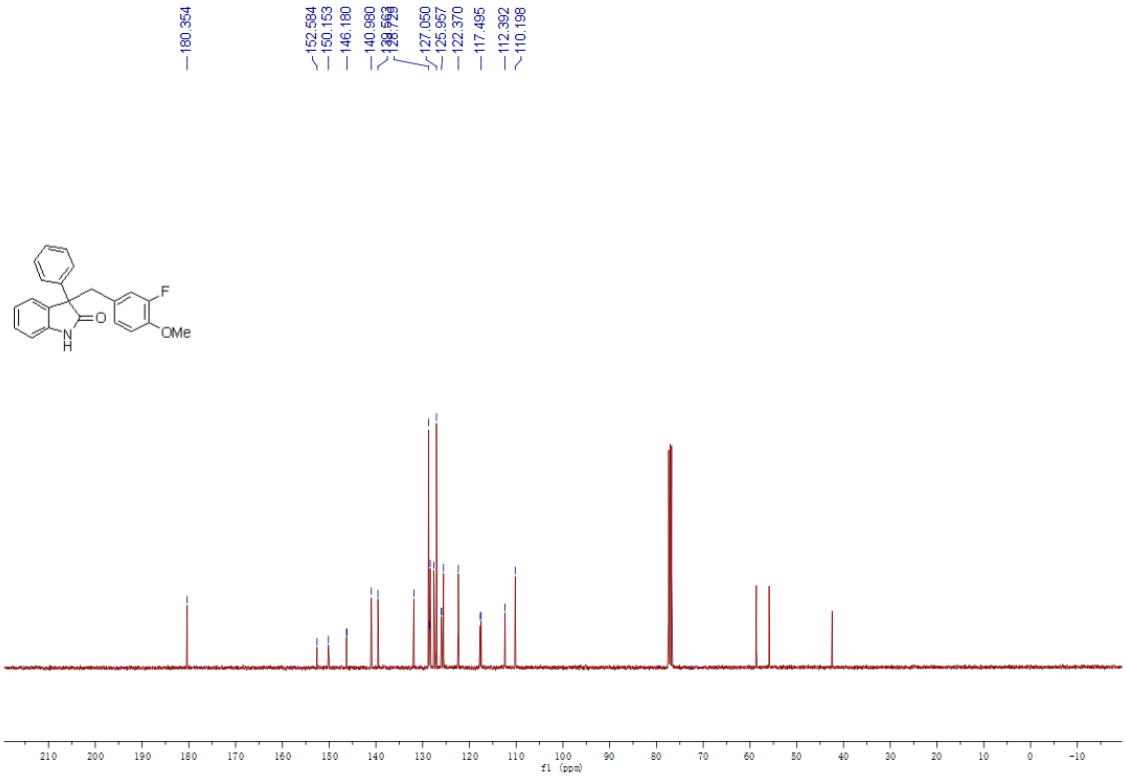

**$^{13}$C NMR spectrum of 3-phenyl-3-(3,4,5-trimethoxybenzyl)indolin-2-one. (45):**



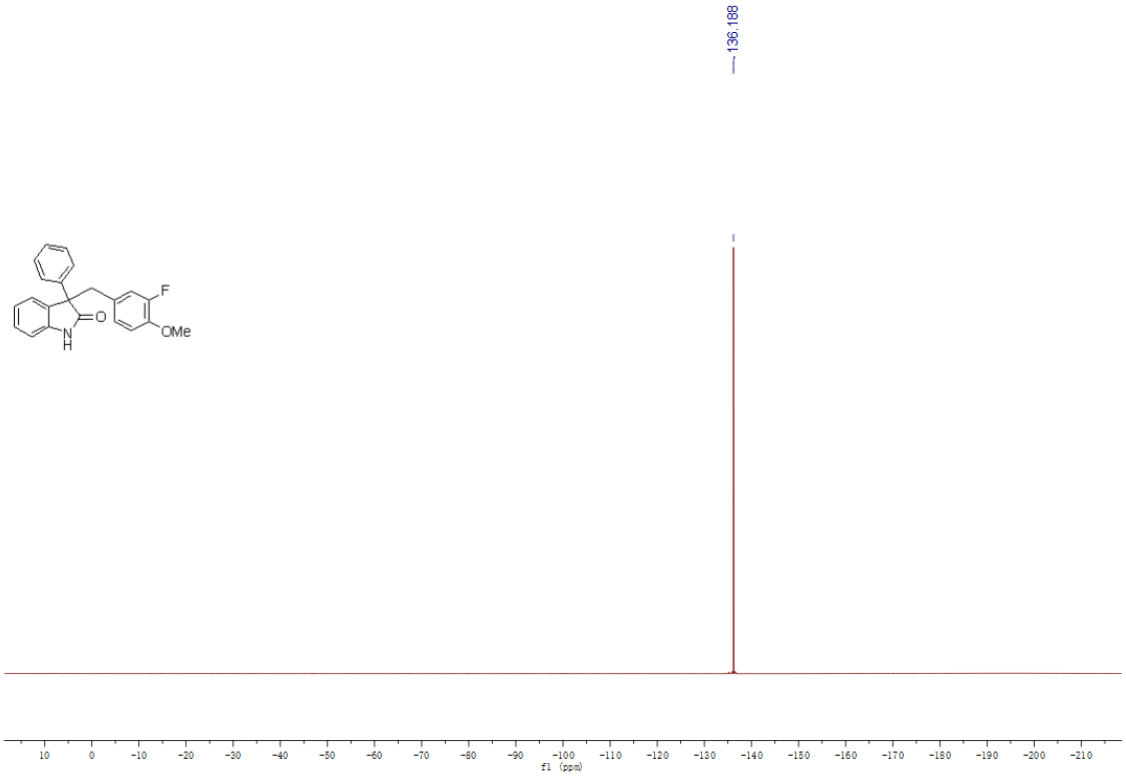
**$^{1}$H NMR spectrum of 3-(3-fluoro-4-methoxybenzyl)-3-phenylindolin-2-one (46):**



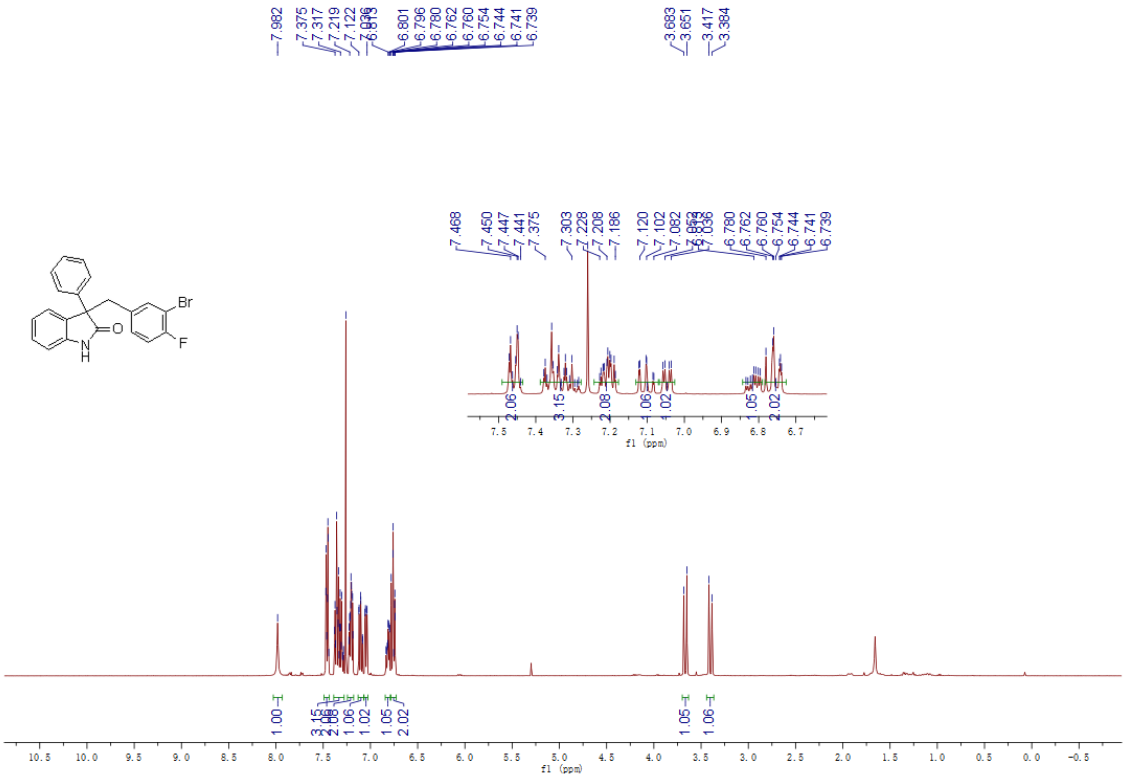

**$^{13}$C NMR spectrum of 3-(3-fluoro-4-methoxybenzyl)-3-phenylindolin-2-one (46):**



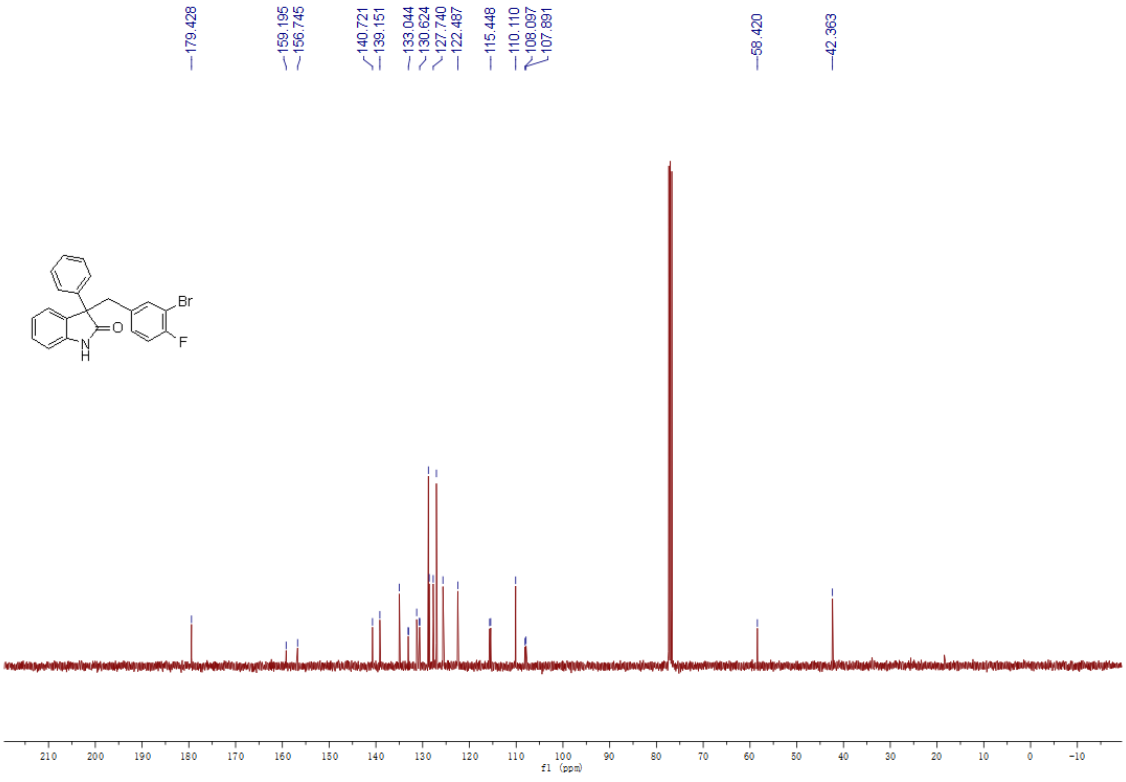
**$^{19}$F NMR spectrum of 3-(3-fluoro-4-methoxybenzyl)-3-phenylindolin-2-one (46):**



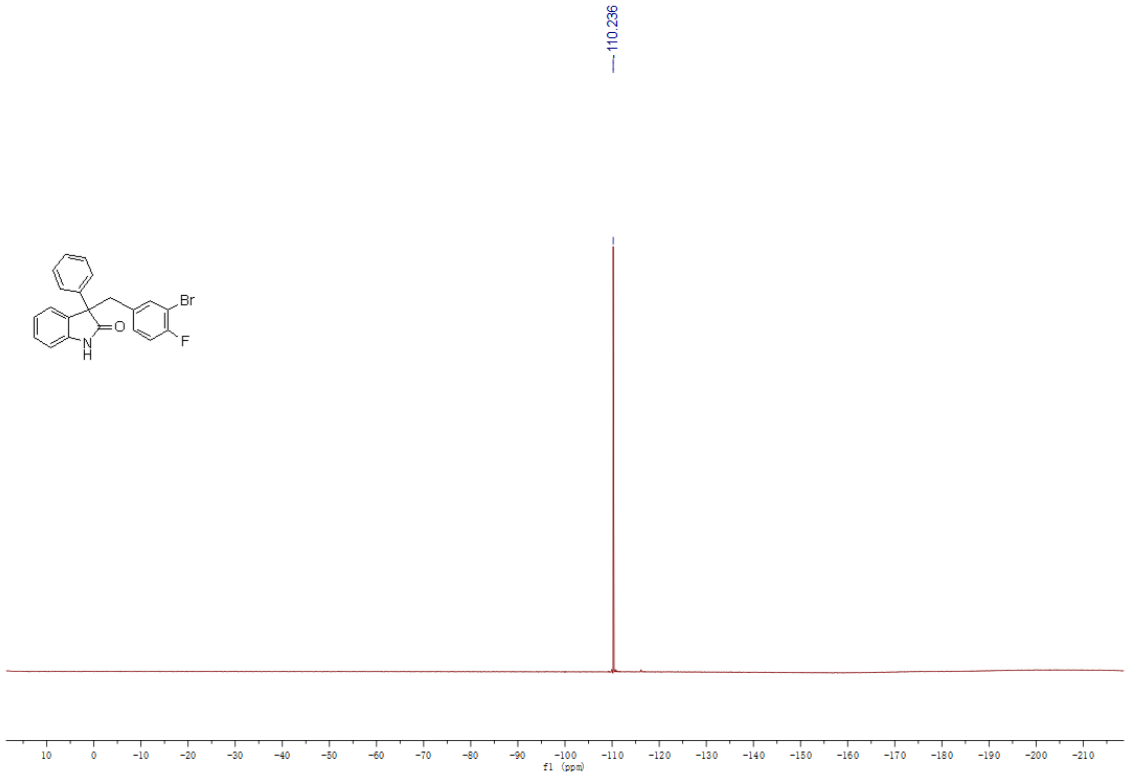
**$^{1}$H NMR spectrum of 3-(3-bromo-4-fluorobenzyl)-3-phenylindolin-2-one (47):**



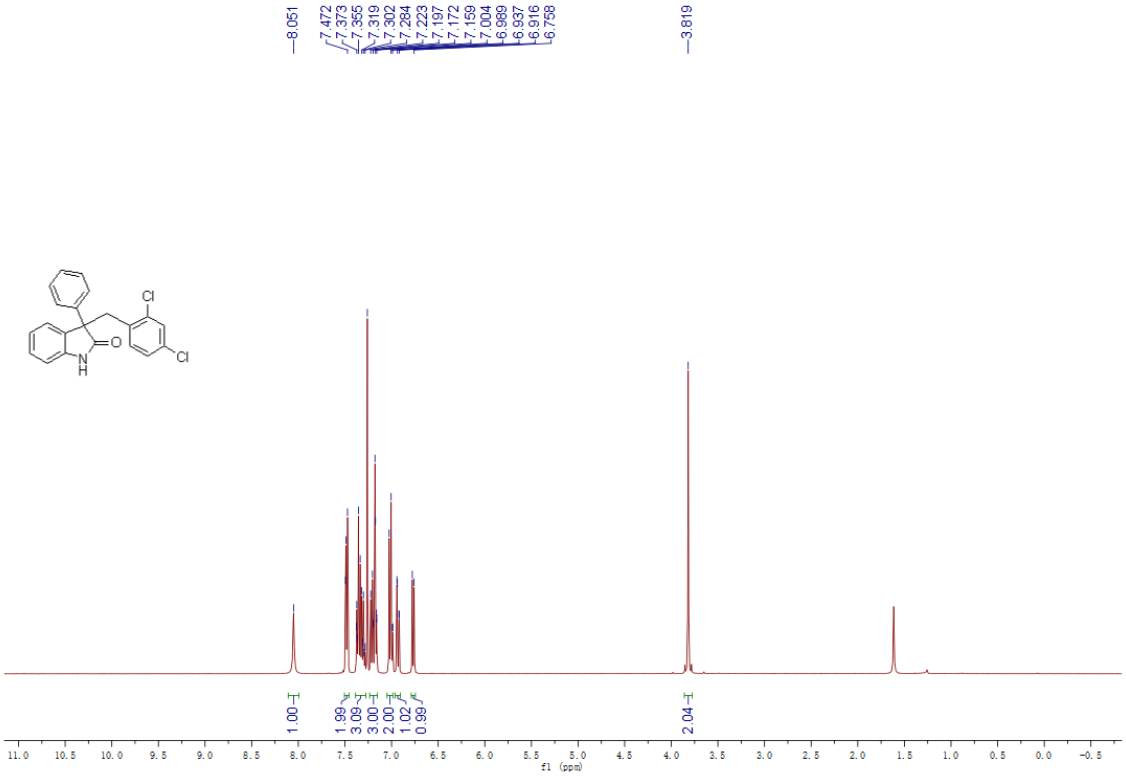

**$^{13}$C NMR spectrum of 3-(3-bromo-4-fluorobenzyl)-3-phenylindolin-2-one (47):**



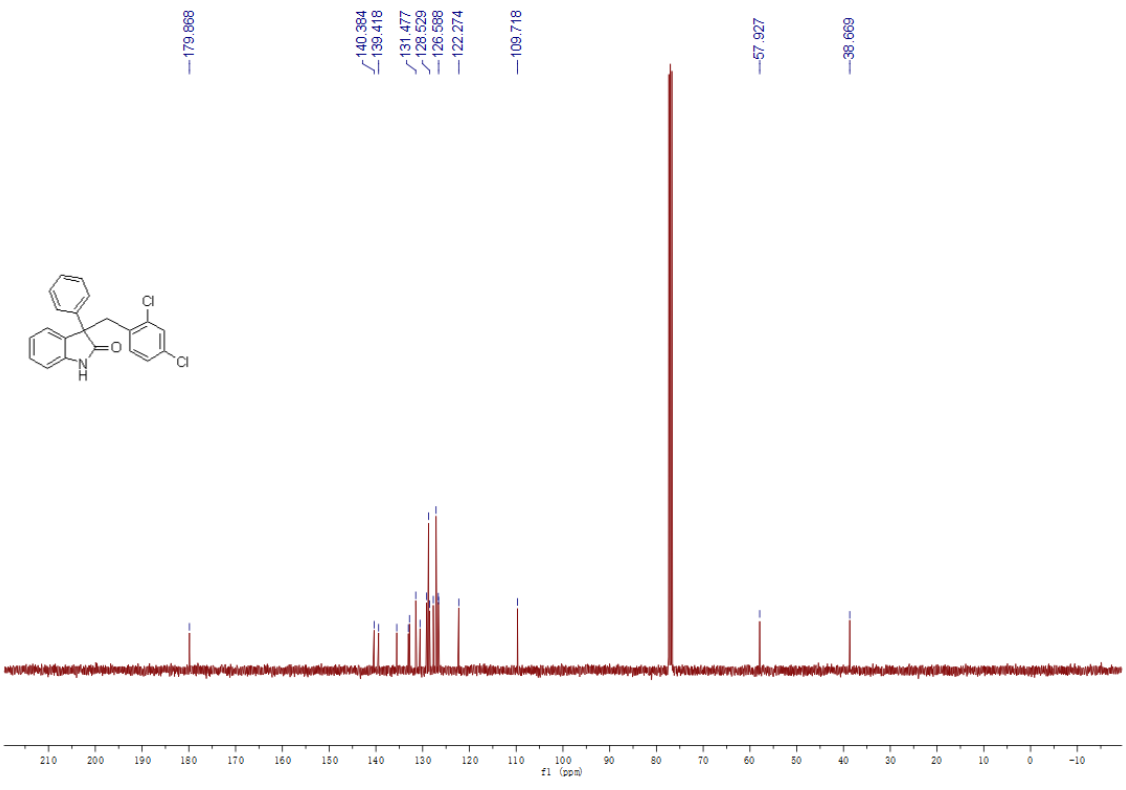
**$^{19}$F NMR spectrum of 3-(3-bromo-4-fluorobenzyl)-3-phenylindolin-2-one (47):**



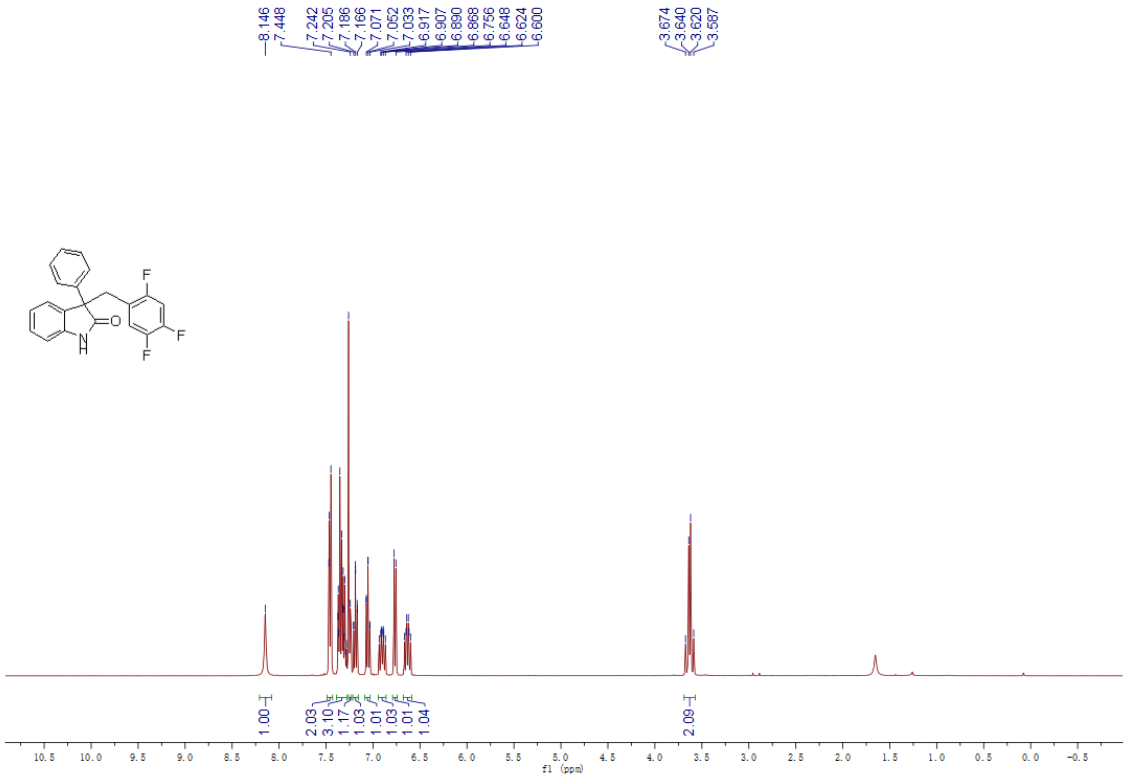
**$^{1}$H NMR spectrum of 3-(2,4-dichlorobenzyl)-3-phenylindolin-2-one (48):**



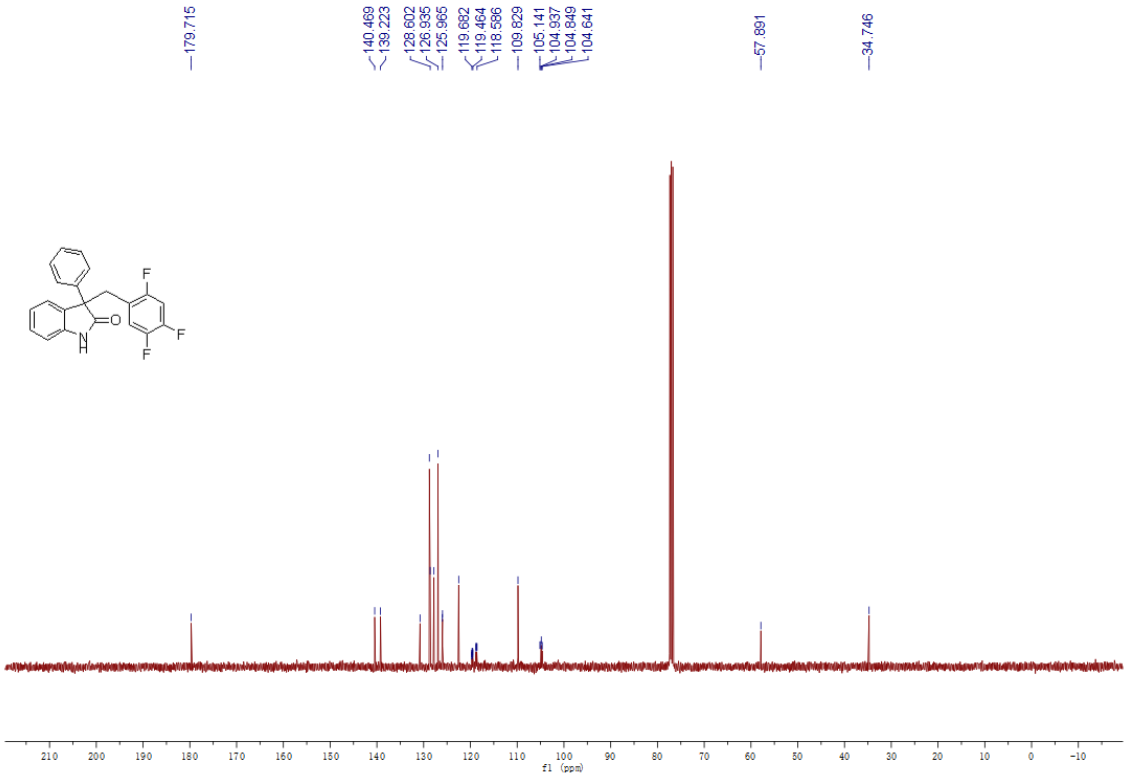

**$^{13}$C NMR spectrum of 3-(2,4-dichlorobenzyl)-3-phenylindolin-2-one (48):**



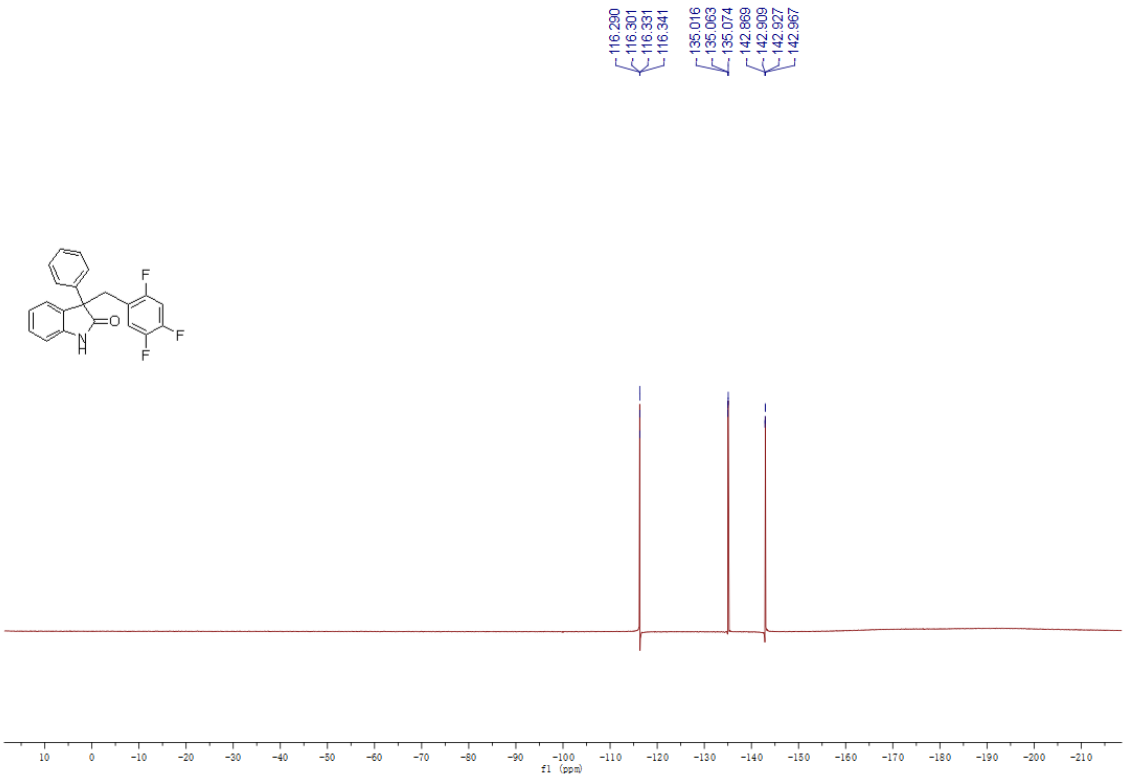
**$^{1}$H NMR spectrum of 3-phenyl-3-(2,4,5-trifluorobenzyl)indolin-2-one (49):**



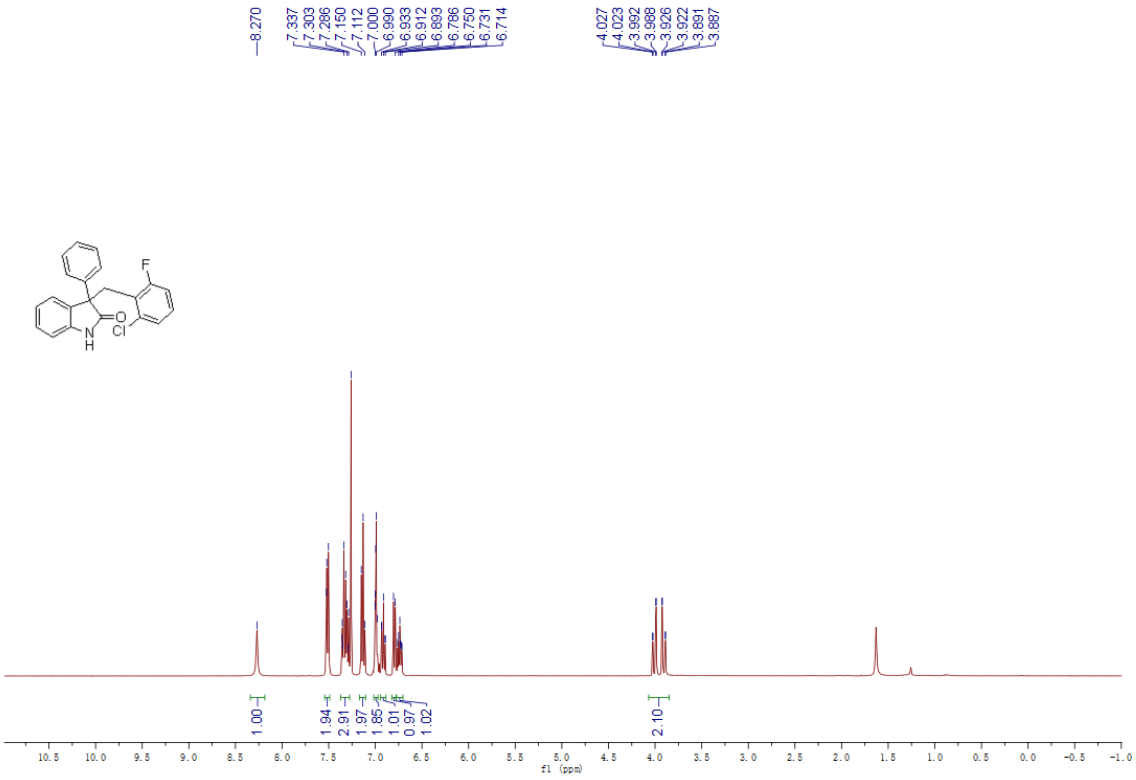

**$^{13}$C NMR spectrum of 3-phenyl-3-(2,4,5-trifluorobenzyl)indolin-2-one (49):**



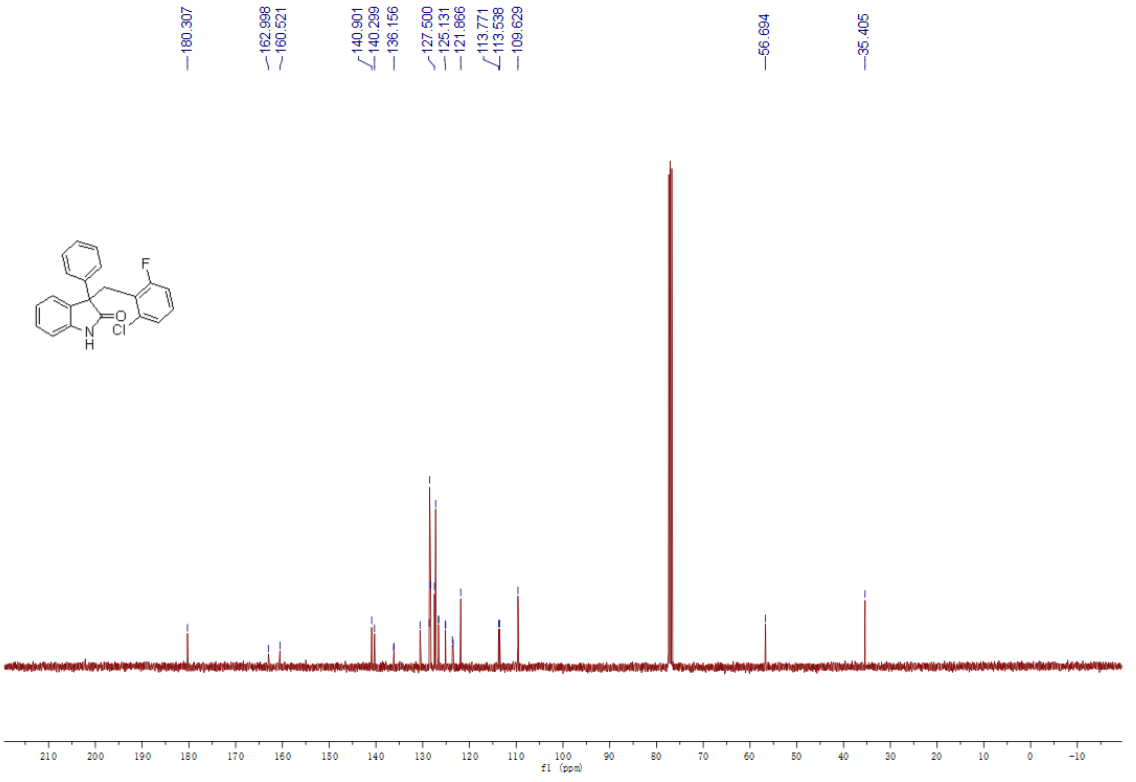
**$^{19}$F NMR spectrum of 3-phenyl-3-(2,4,5-trifluorobenzyl)indolin-2-one (49):**



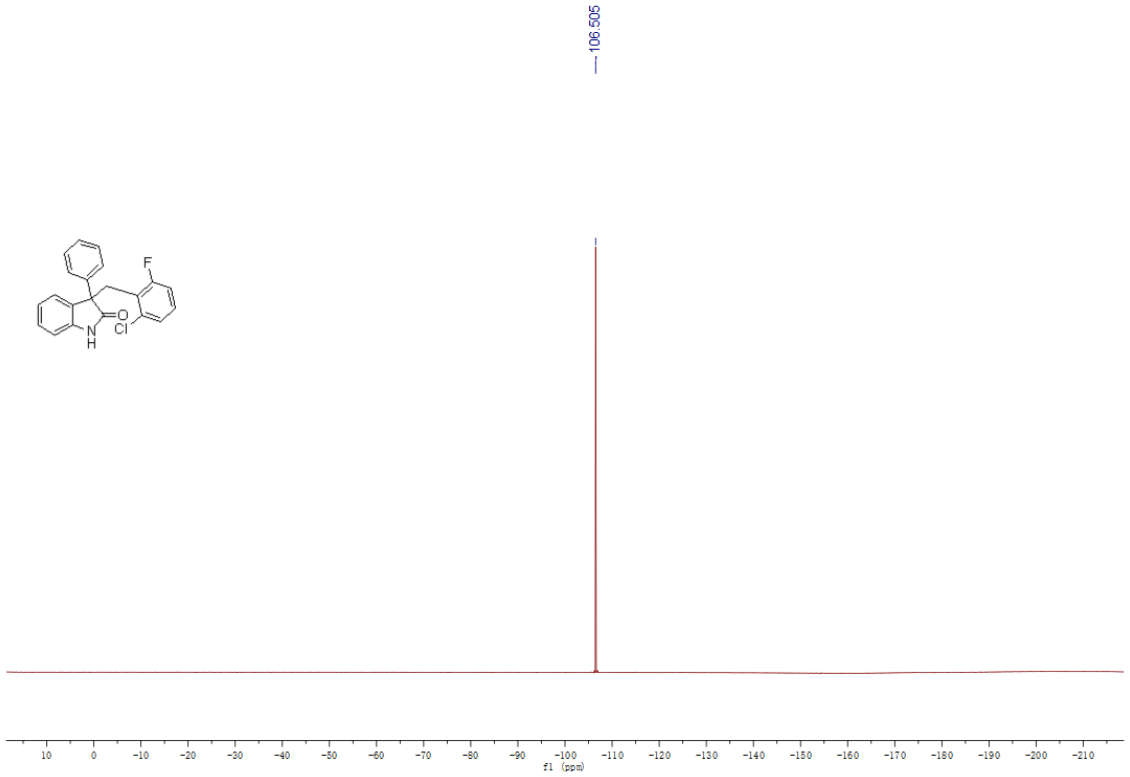
**$^{1}$H NMR spectrum of 3-(2-chloro-6-fluorobenzyl)-3-phenylindolin-2-one (50):**



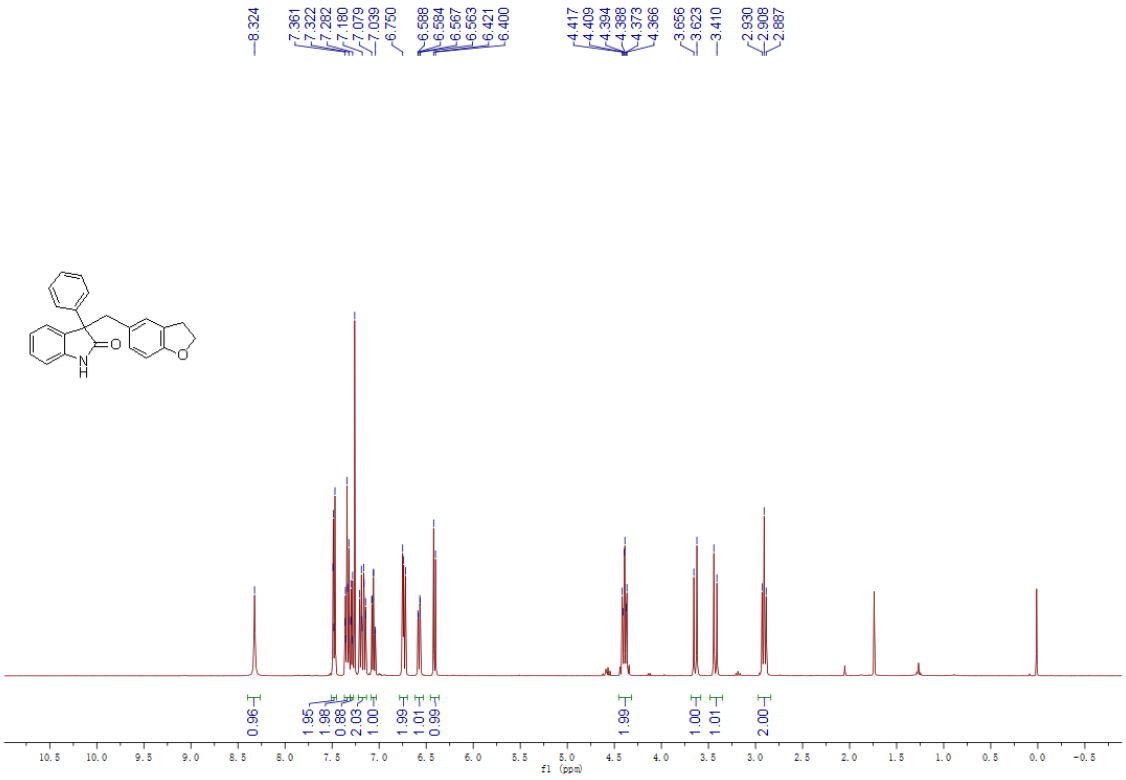

**$^{13}$C NMR spectrum of 3-(2-chloro-6-fluorobenzyl)-3-phenylindolin-2-one (50):**



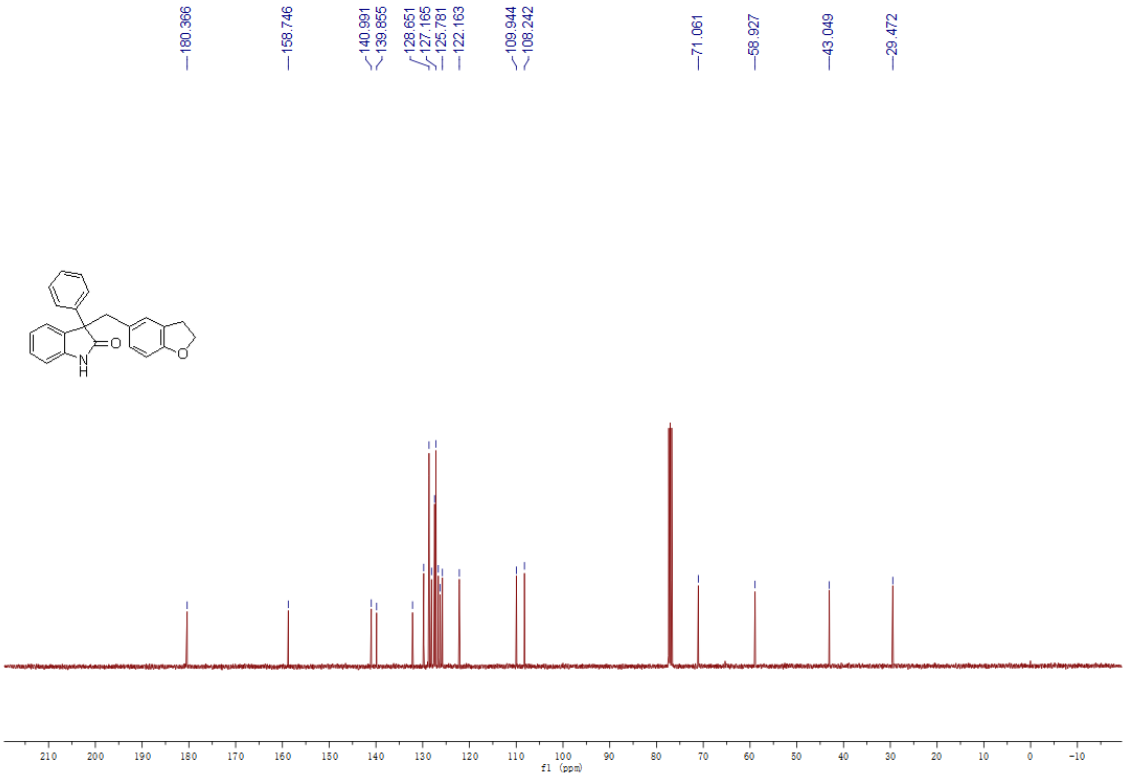
**$^{19}$F NMR spectrum of 3-(2-chloro-6-fluorobenzyl)-3-phenylindolin-2-one (50):**



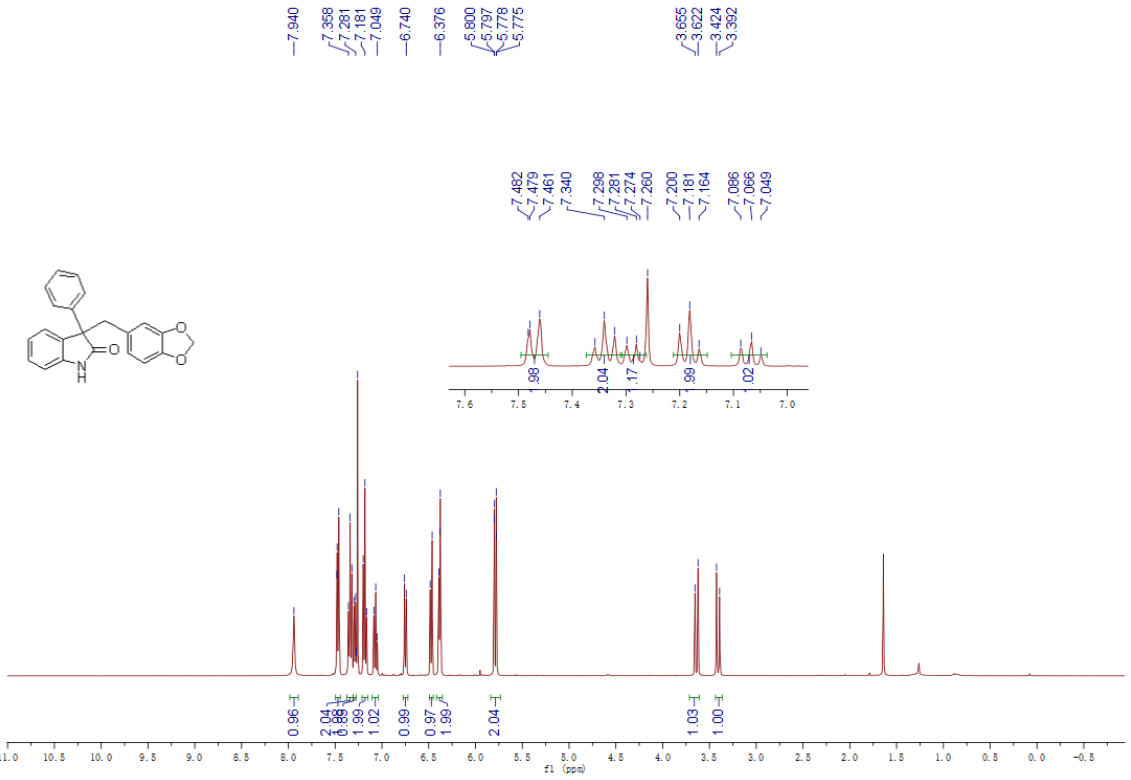
**$^{1}$H NMR spectrum of 3-((2,3-dihydrobenzofuran-5-yl)methyl)-3-phenylindolin-2-one (51):**



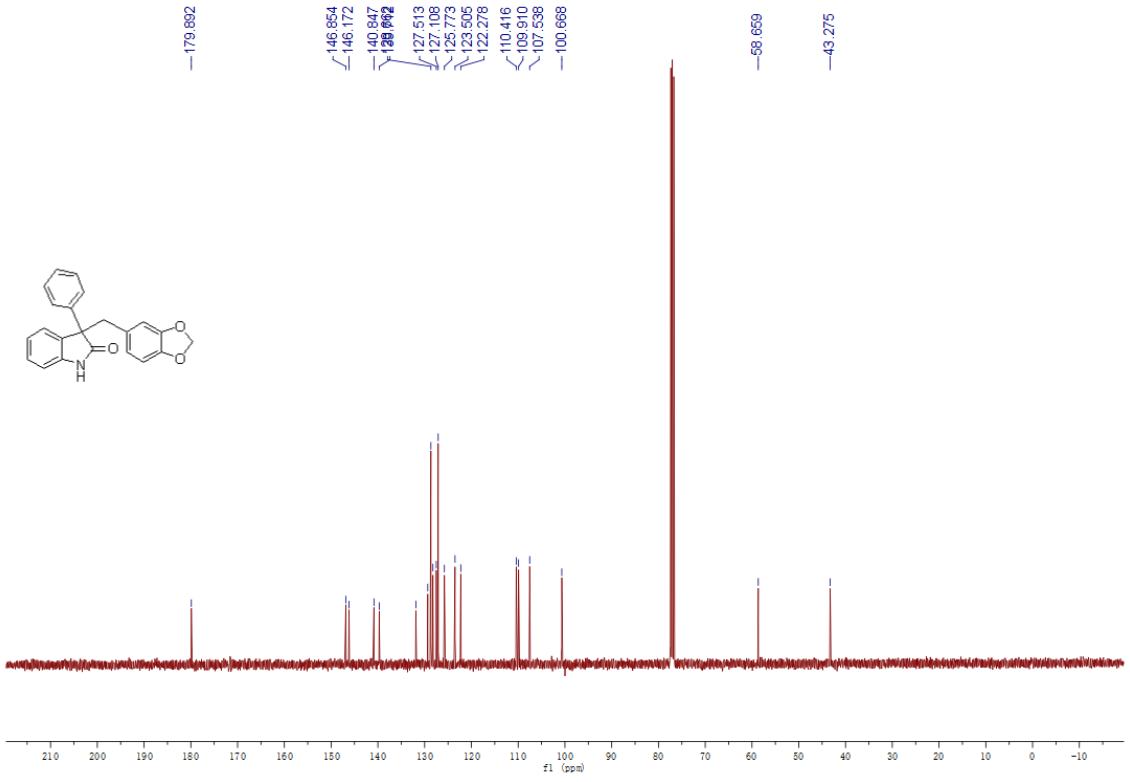

**$^{13}$C NMR spectrum of 3-((2,3-dihydrobenzofuran-5-yl)methyl)-3-phenylindolin-2-one (51):**



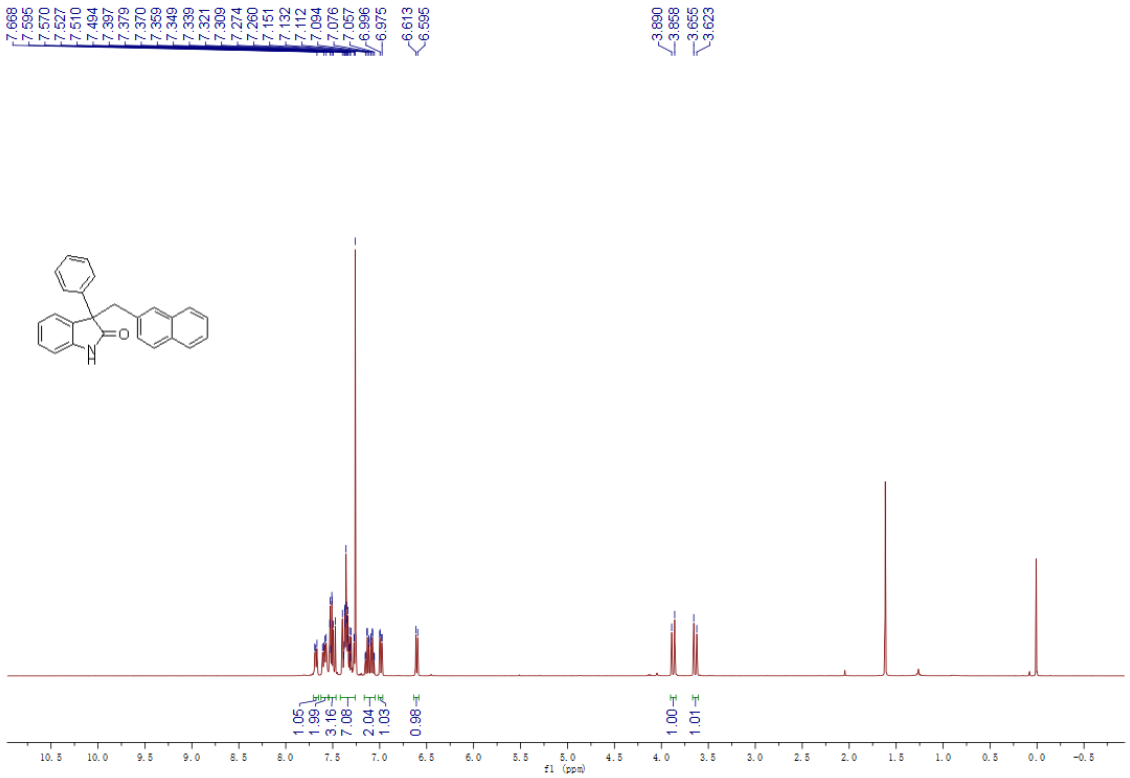
**$^{1}$H NMR spectrum of 3-(benzo[d][1,3]dioxol-5-ylmethyl)-3-phenylindolin-2-one (52):**



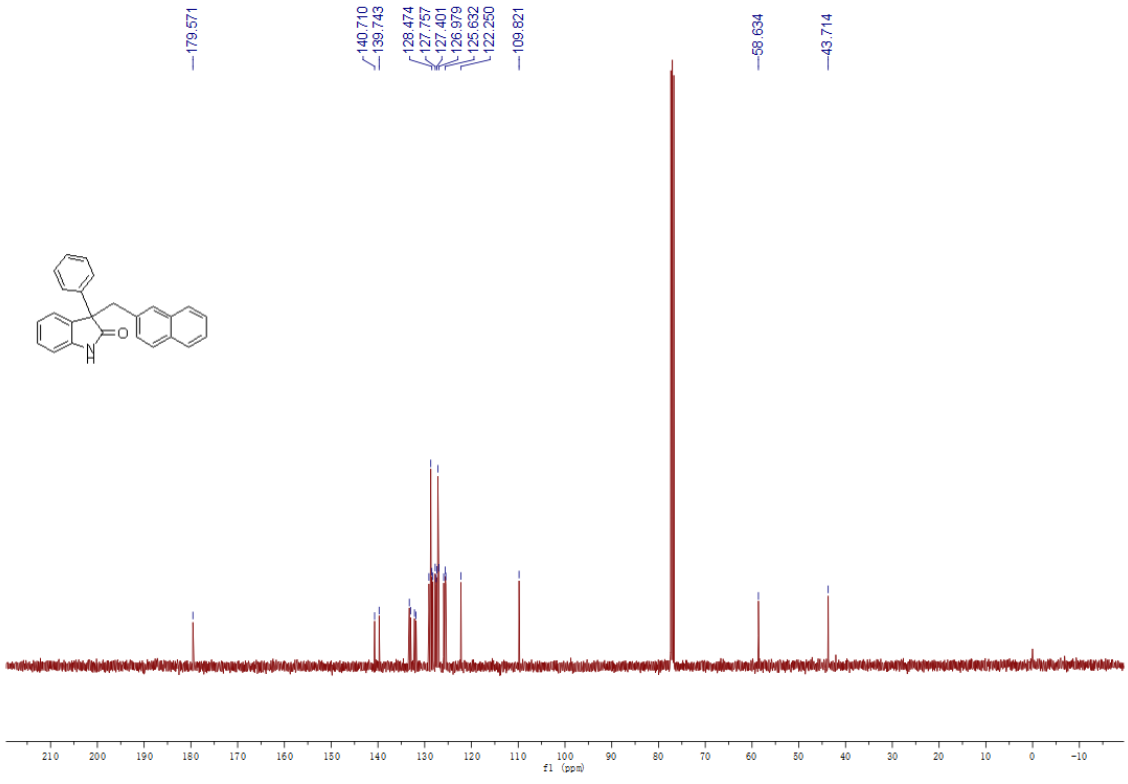

**$^{13}$C NMR spectrum of 3-(benzo[d][1,3]dioxol-5-ylmethyl)-3-phenylindolin-2-one (52)**



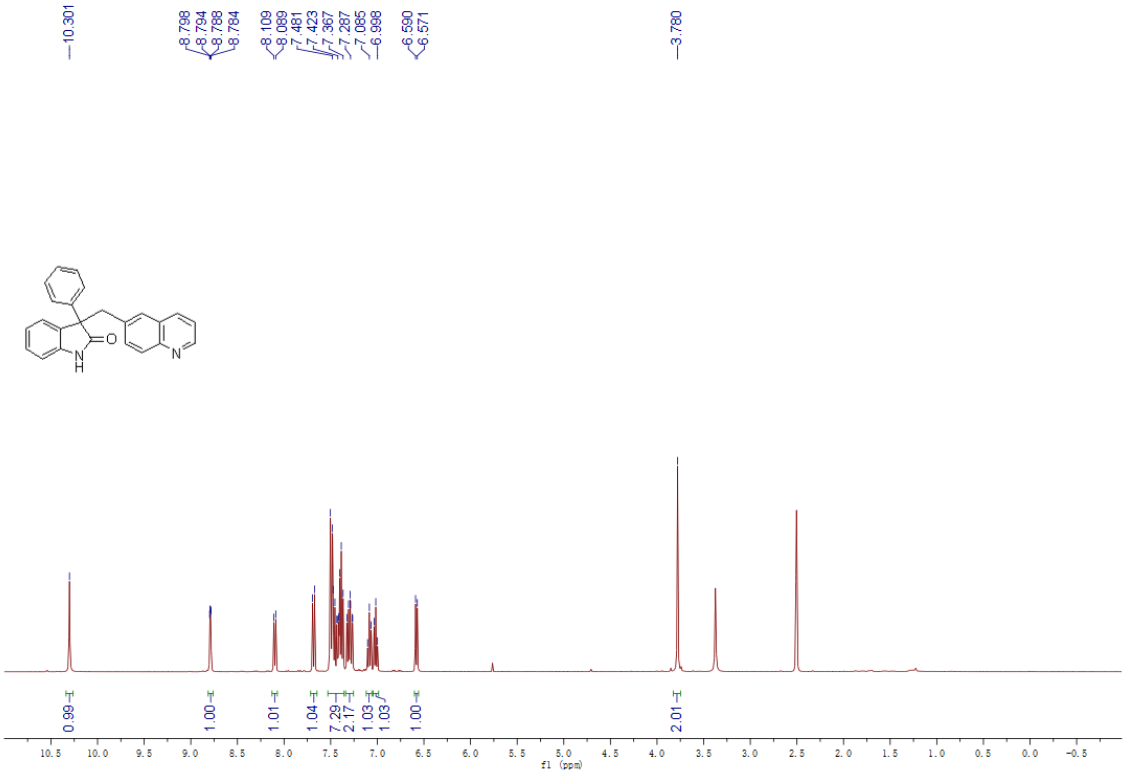
**$^{1}$H NMR spectrum of 3-(naphthalen-2-ylmethyl)-3-phenylindolin-2-one (53):**



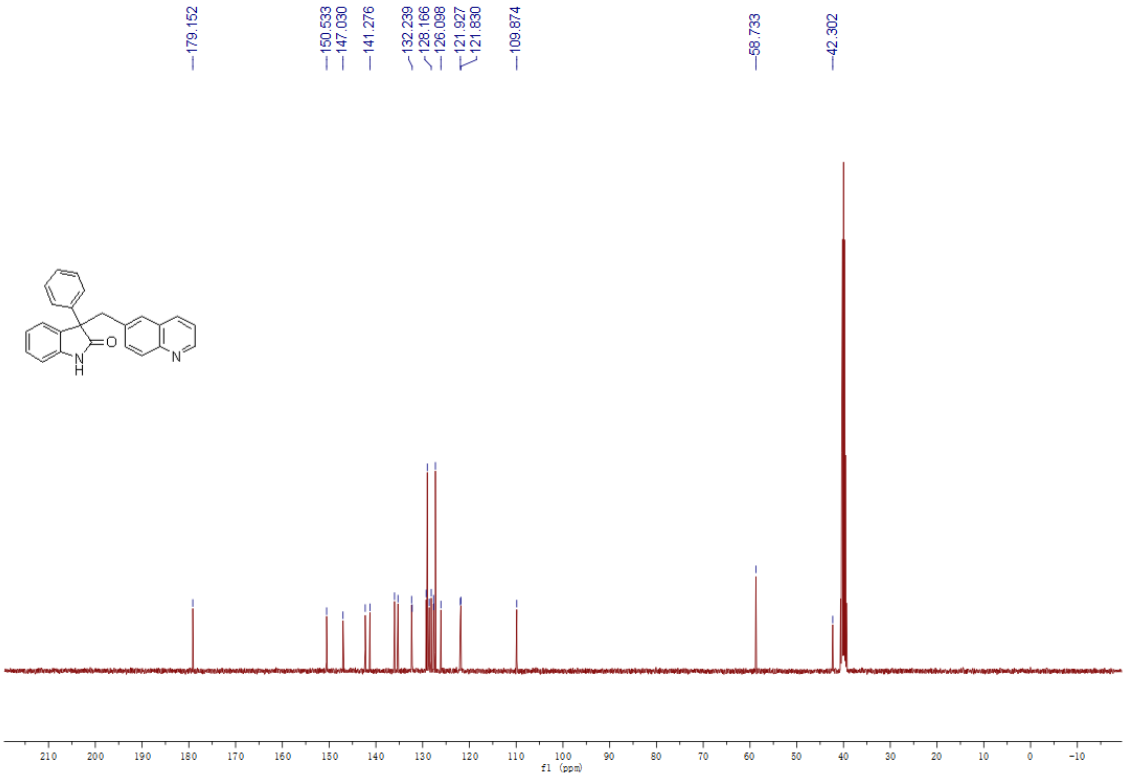

**$^{13}$C NMR spectrum of 3-(naphthalen-2-ylmethyl)-3-phenylindolin-2-one (53):**



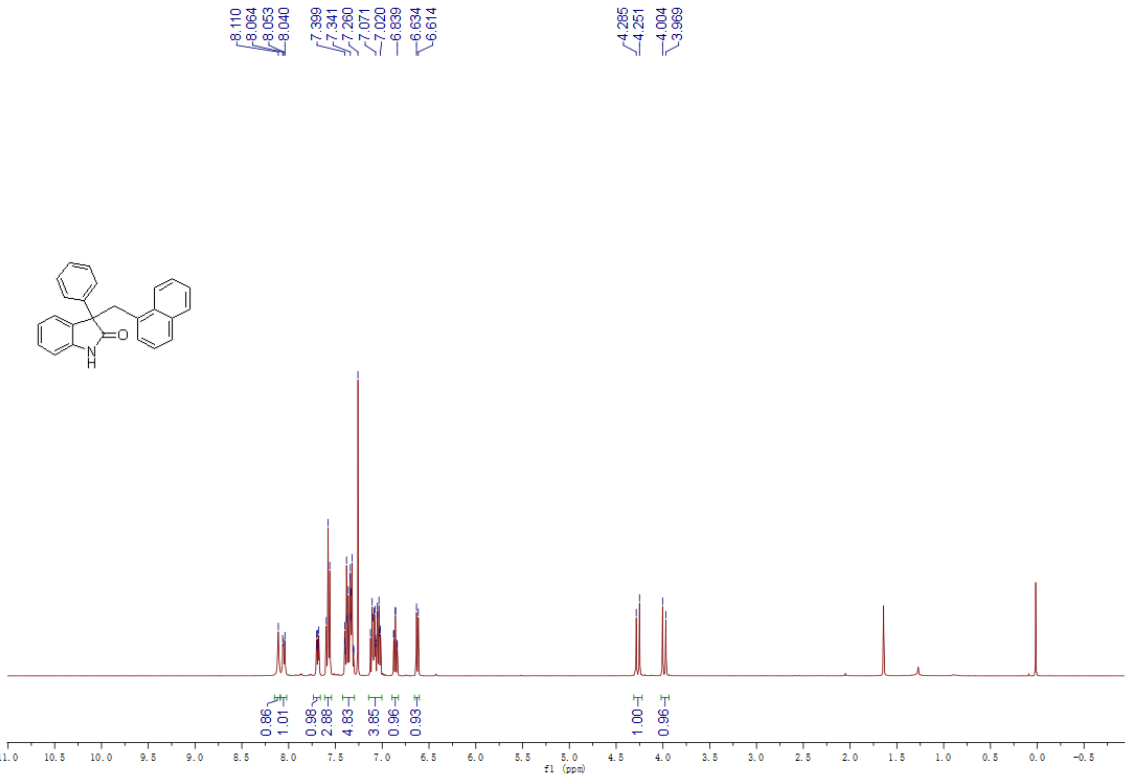
**$^{1}$H NMR spectrum of 3-phenyl-3-(quinolin-6-ylmethyl)indolin-2-one (54):**



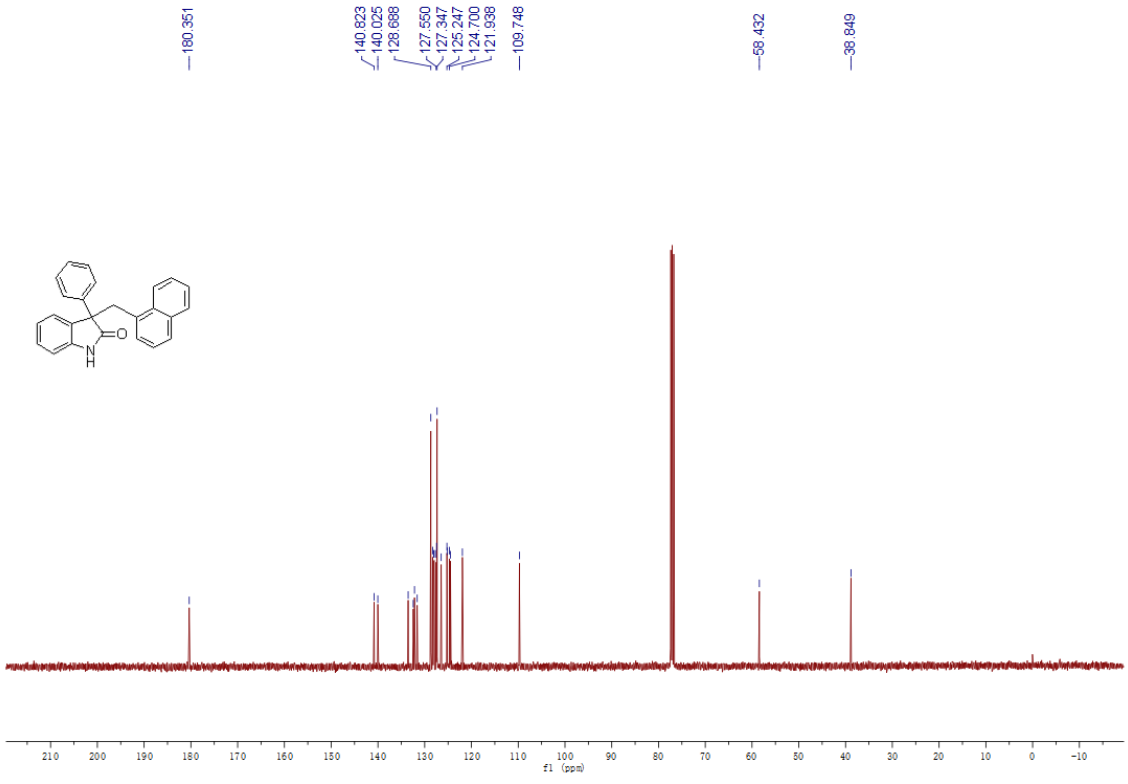

**$^{13}$C NMR spectrum of 3-phenyl-3-(quinolin-6-ylmethyl)indolin-2-one (54):**



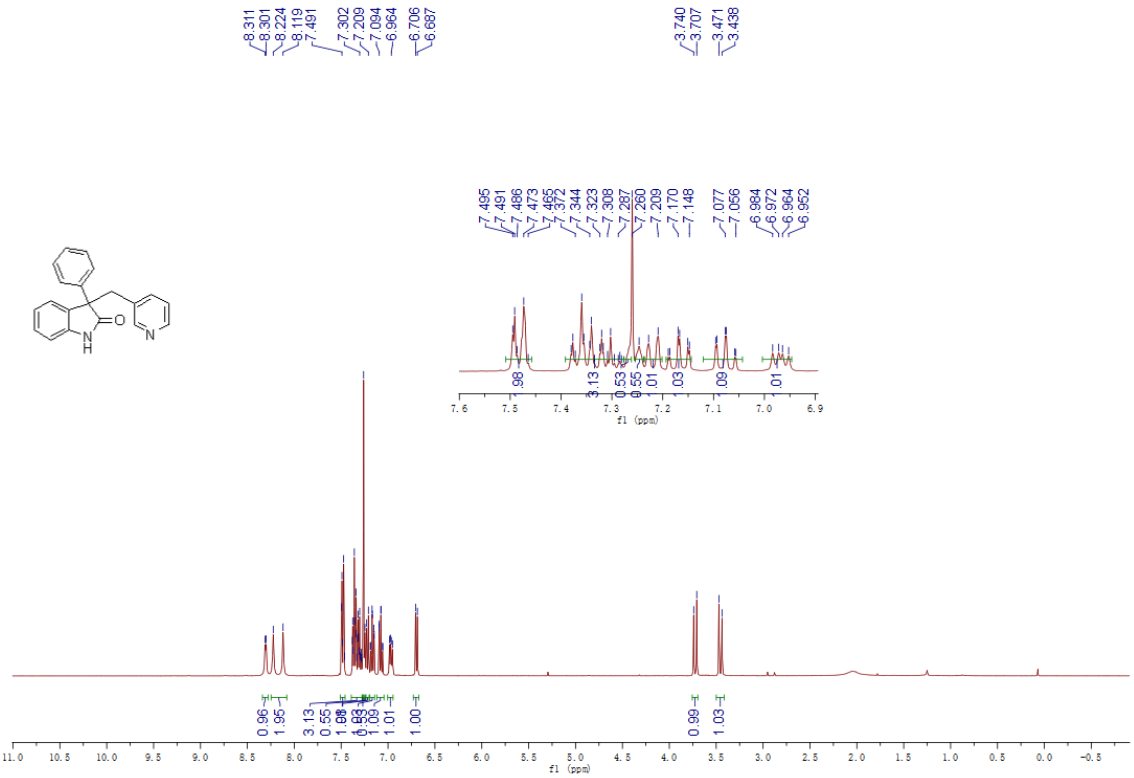
**$^{1}$H NMR spectrum of 3-(naphthalen-1-ylmethyl)-3-phenylindolin-2-one (55):**



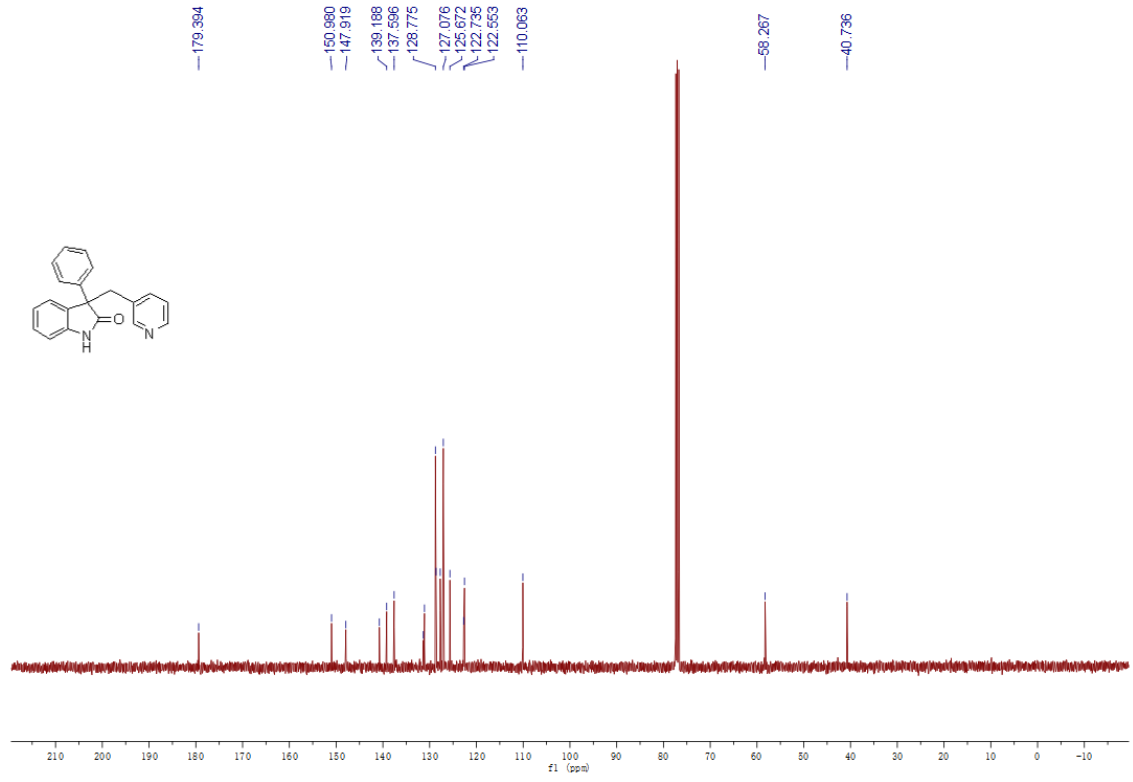

**$^{13}$C NMR spectrum of 3-(naphthalen-1-ylmethyl)-3-phenylindolin-2-one (55):**



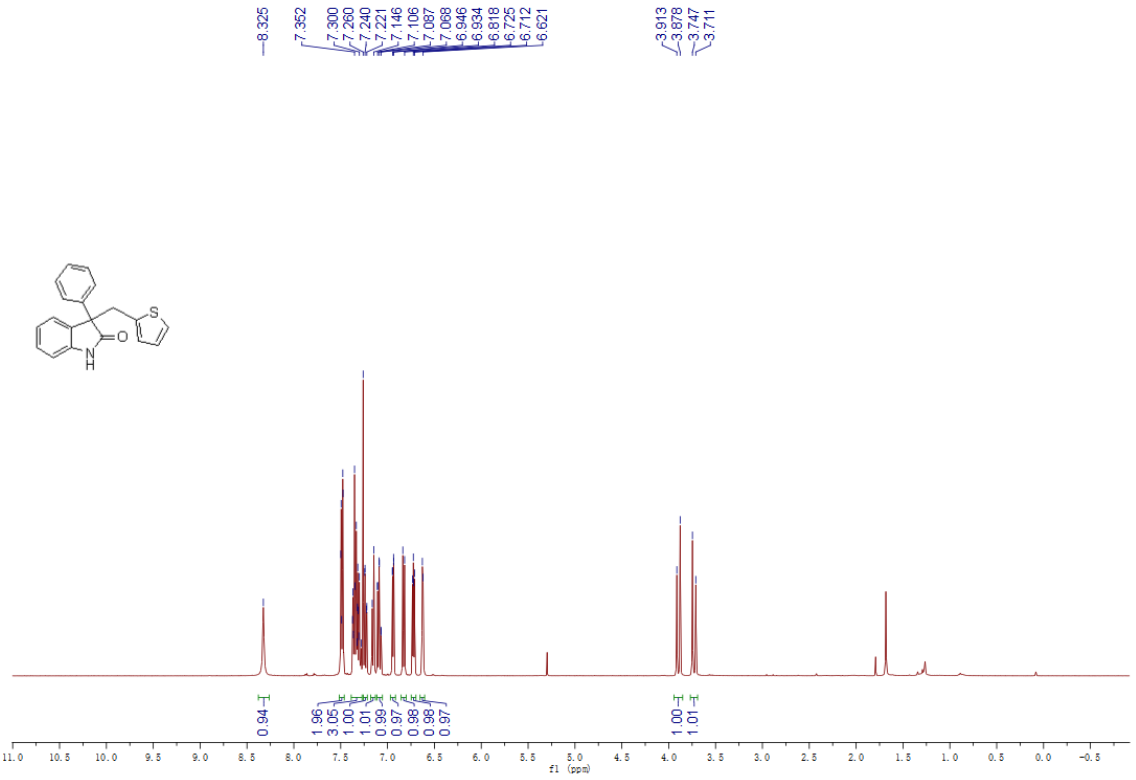
**$^{1}$H NMR spectrum of 3-phenyl-3-(pyridin-3-ylmethyl)indolin-2-one (56):**



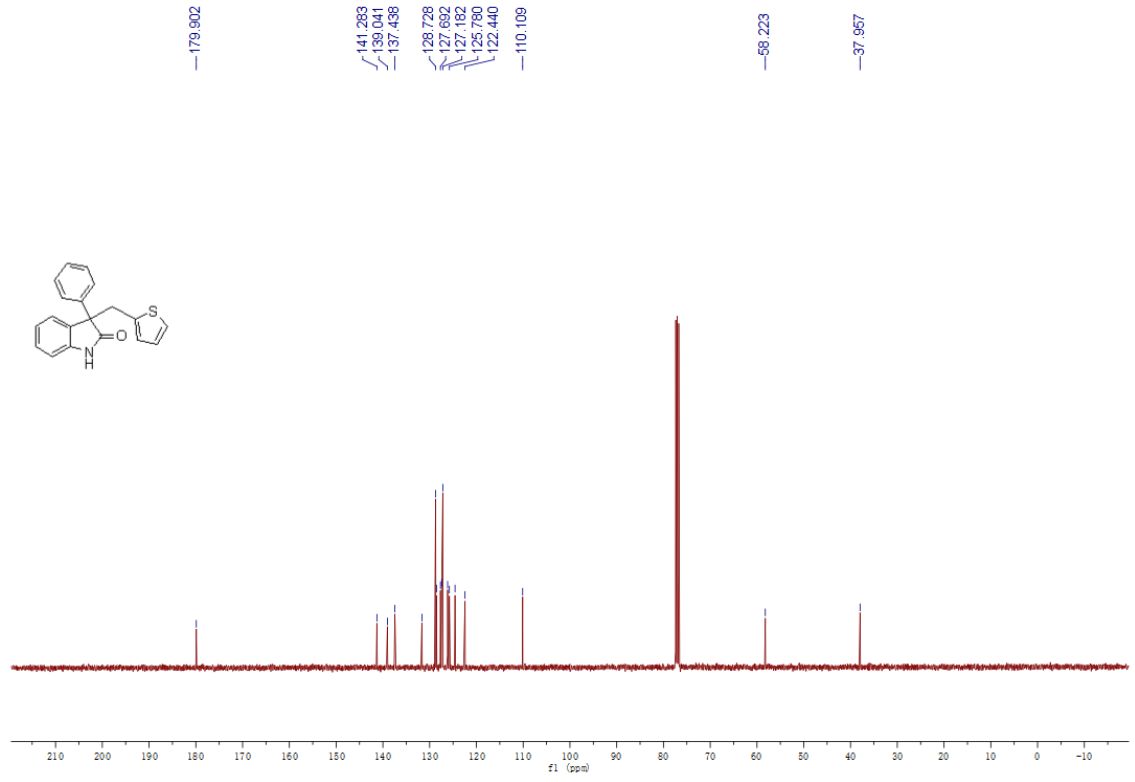
**$^{13}$C NMR spectrum of 3-phenyl-3-(pyridin-3-ylmethyl)indolin-2-one (56):**



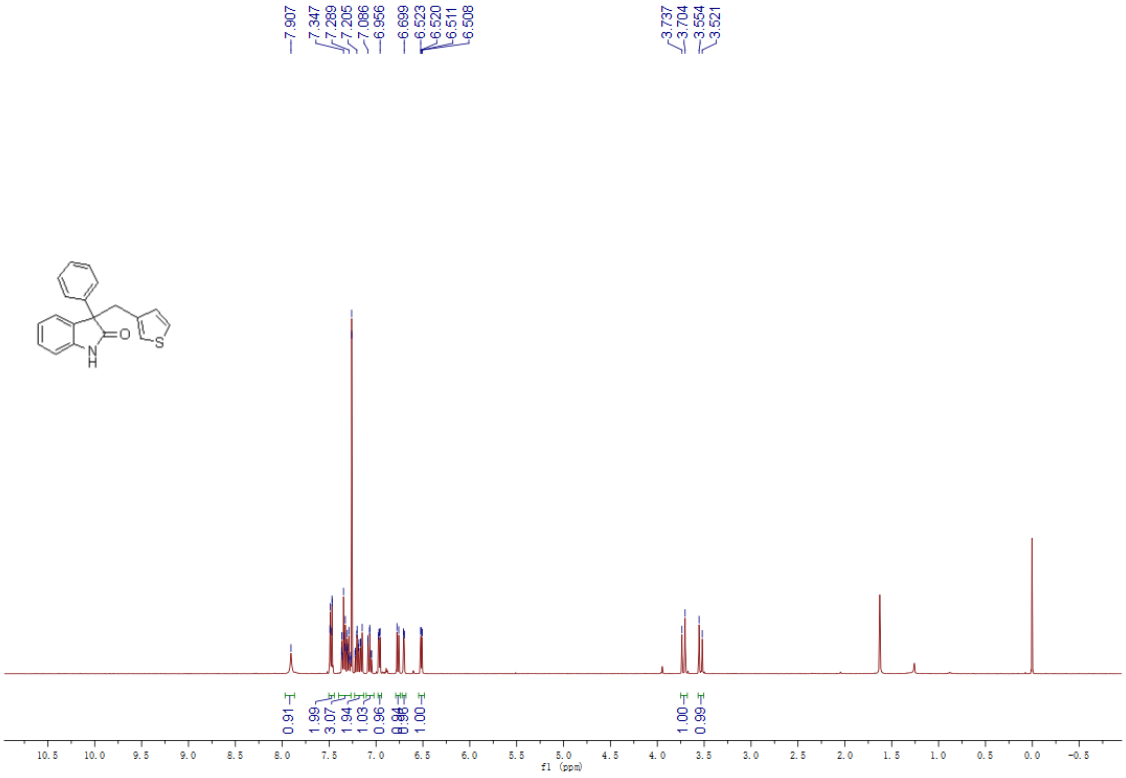
**$^{1}$H NMR spectrum of 3-phenyl-3-(thiophen-2-ylmethyl)indolin-2-one (57):**



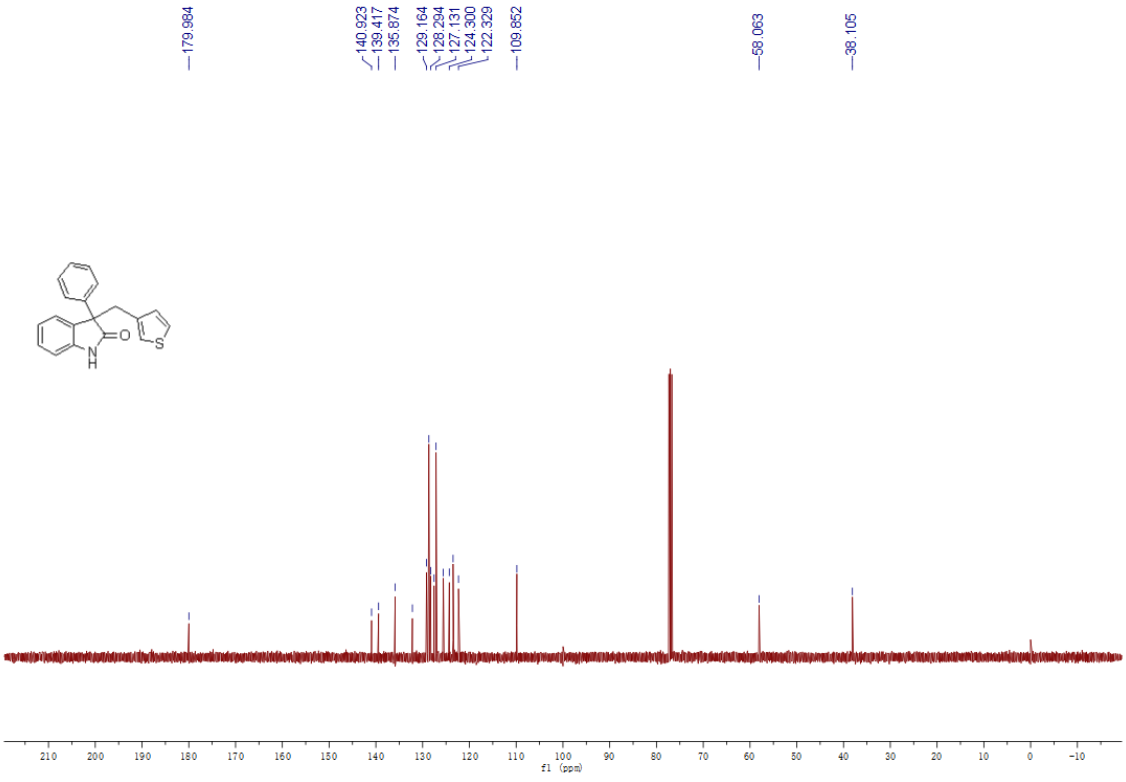

**$^{13}$C NMR spectrum of 3-phenyl-3-(thiophen-2-ylmethyl)indolin-2-one (57):**



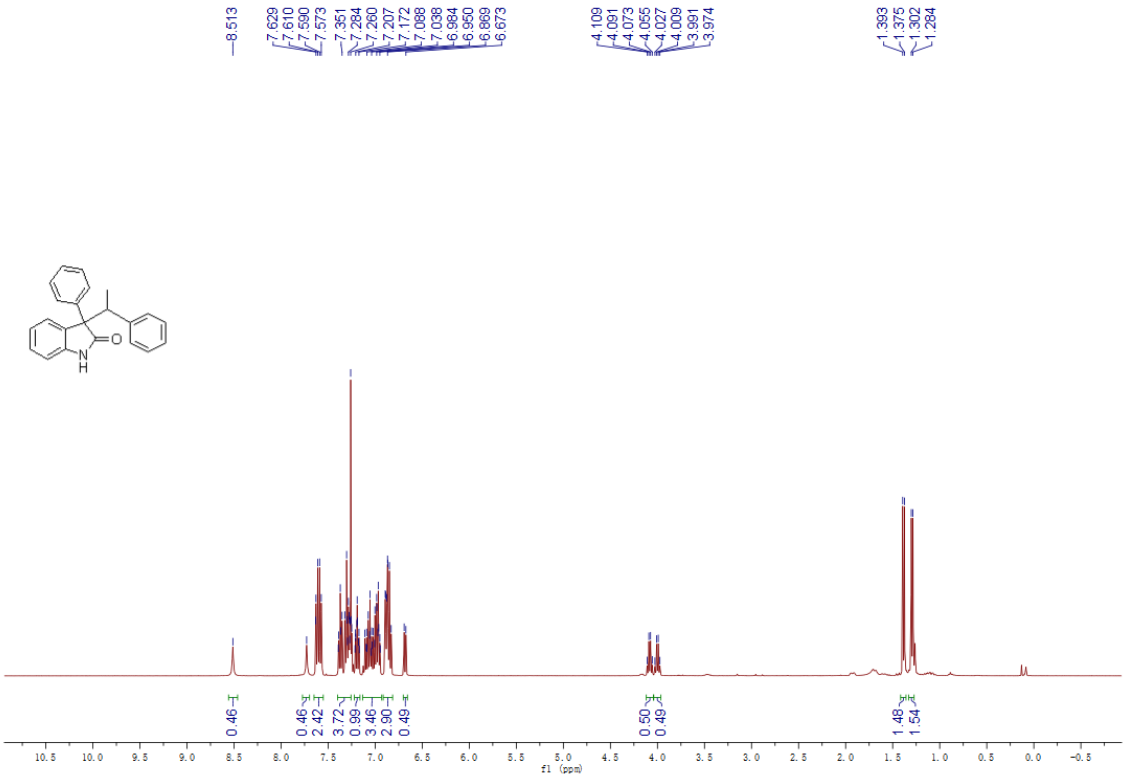
**$^{1}$H NMR spectrum of 3-phenyl-3-(thiophen-3-ylmethyl)indolin-2-one (58):**



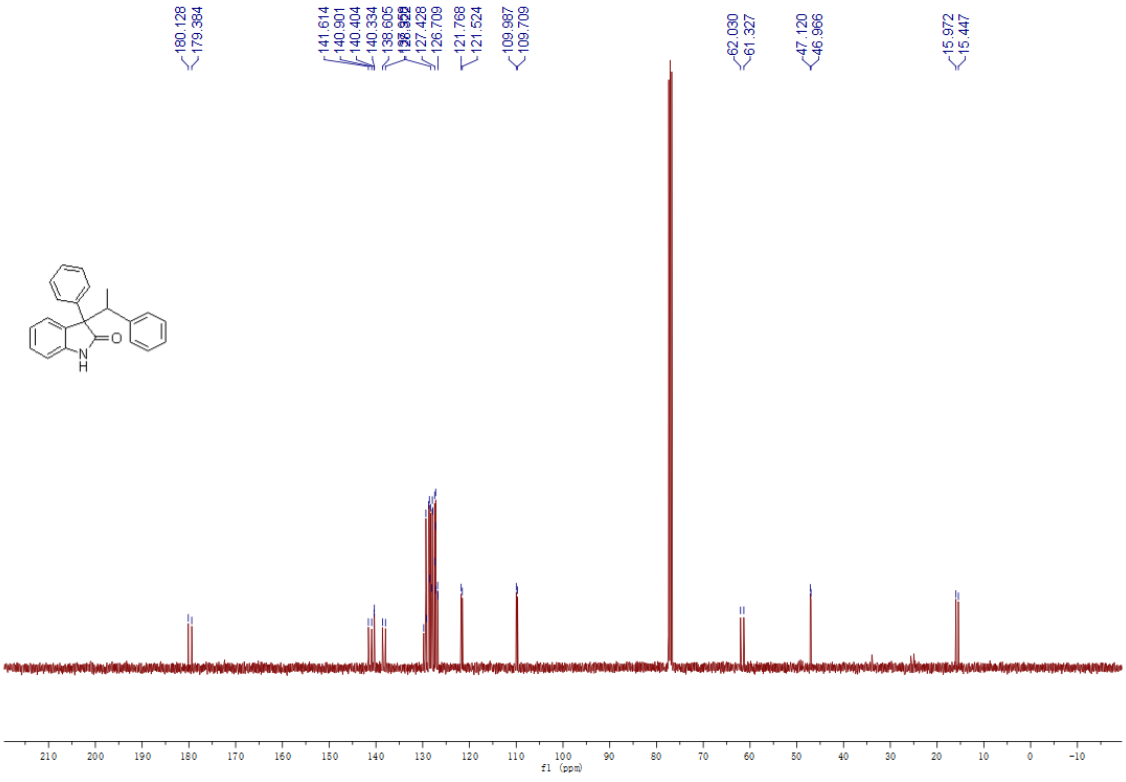

**$^{13}$C NMR spectrum of 3-phenyl-3-(thiophen-3-ylmethyl)indolin-2-one (58):**



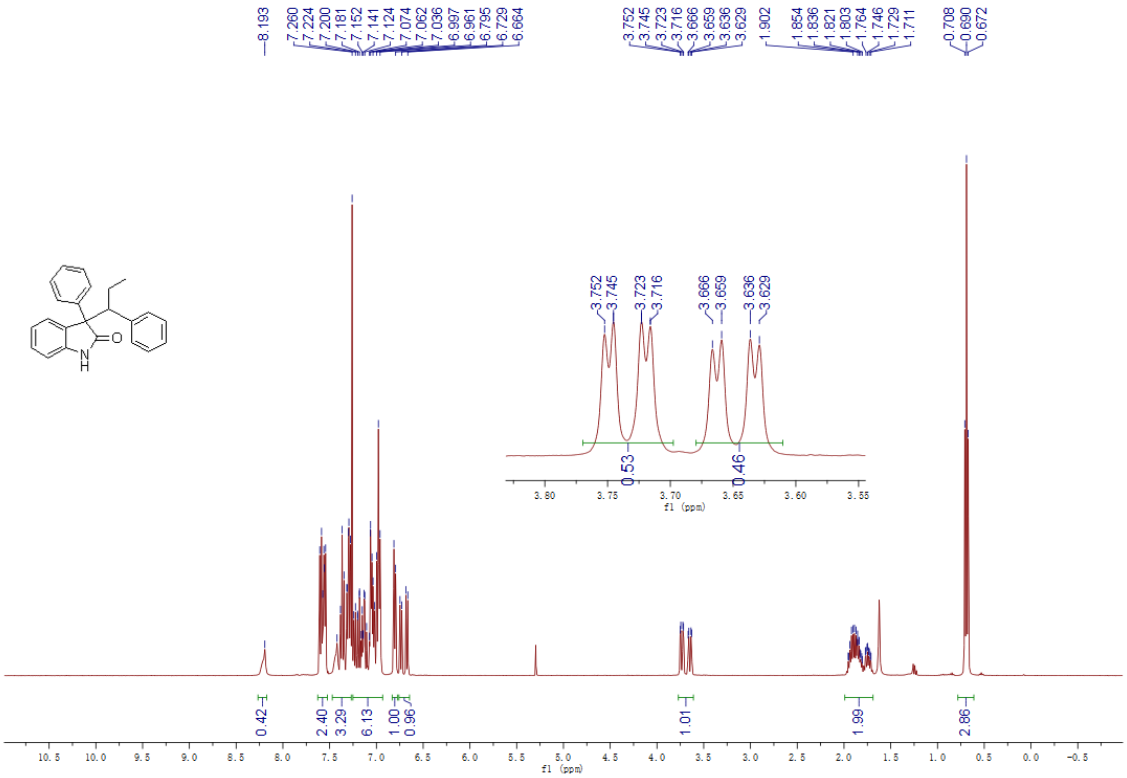
**$^{1}$H NMR spectrum of 3-phenyl-3-(1-phenylethyl)indolin-2-one (59, d.r. = 1 : 1):**



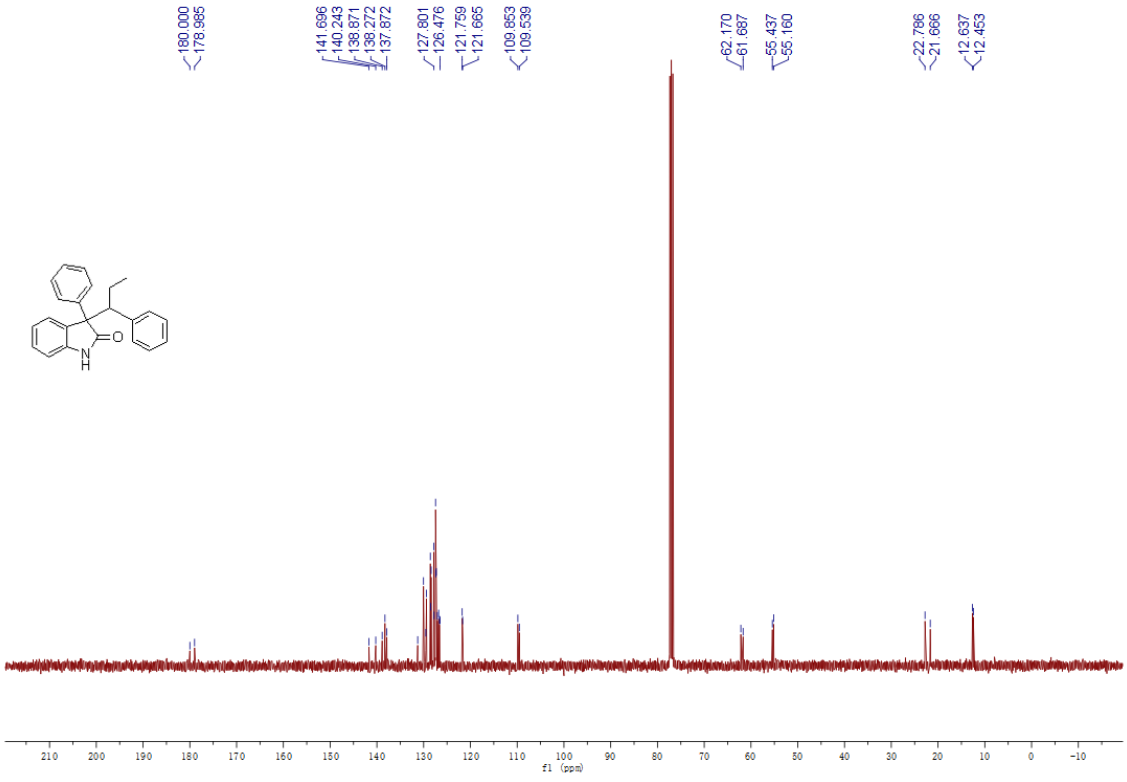

**$^{13}$C NMR spectrum of 3-phenyl-3-(1-phenylethyl)indolin-2-one (59, d.r. = 1 : 1):**



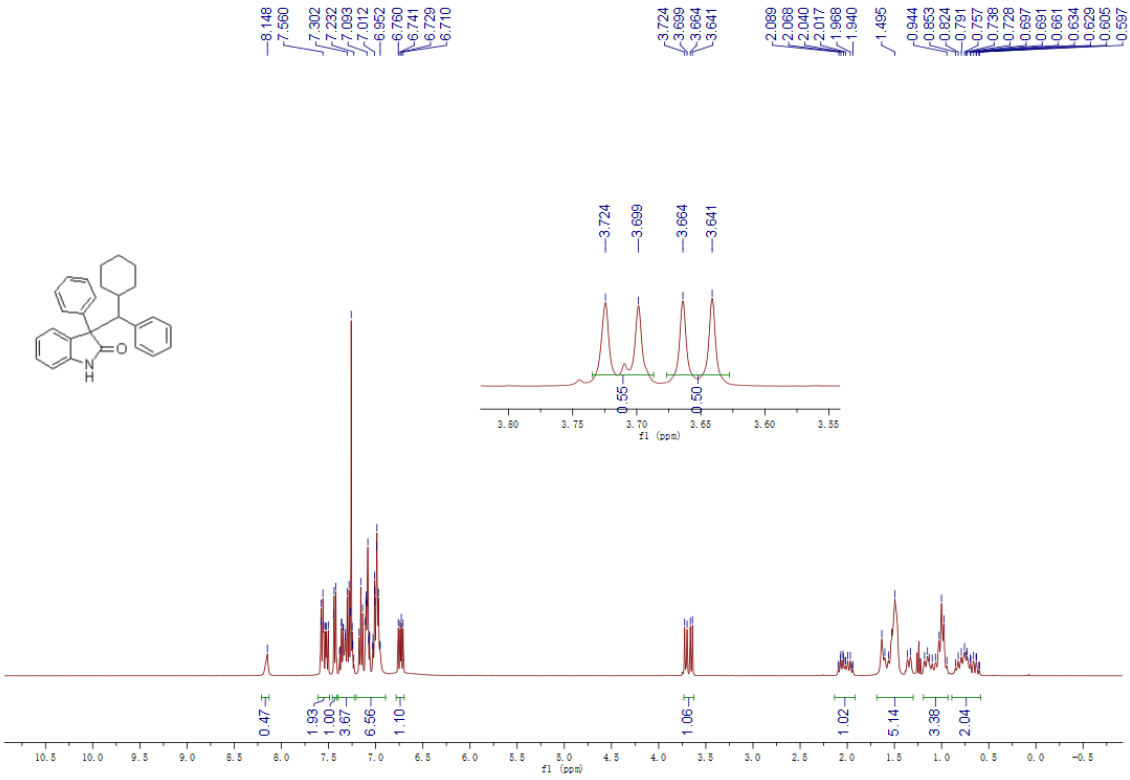
**$^{1}$H NMR spectrum of 3-phenyl-3-(1-phenylpropyl)indolin-2-one (60, d.r. = 1 : 1):**



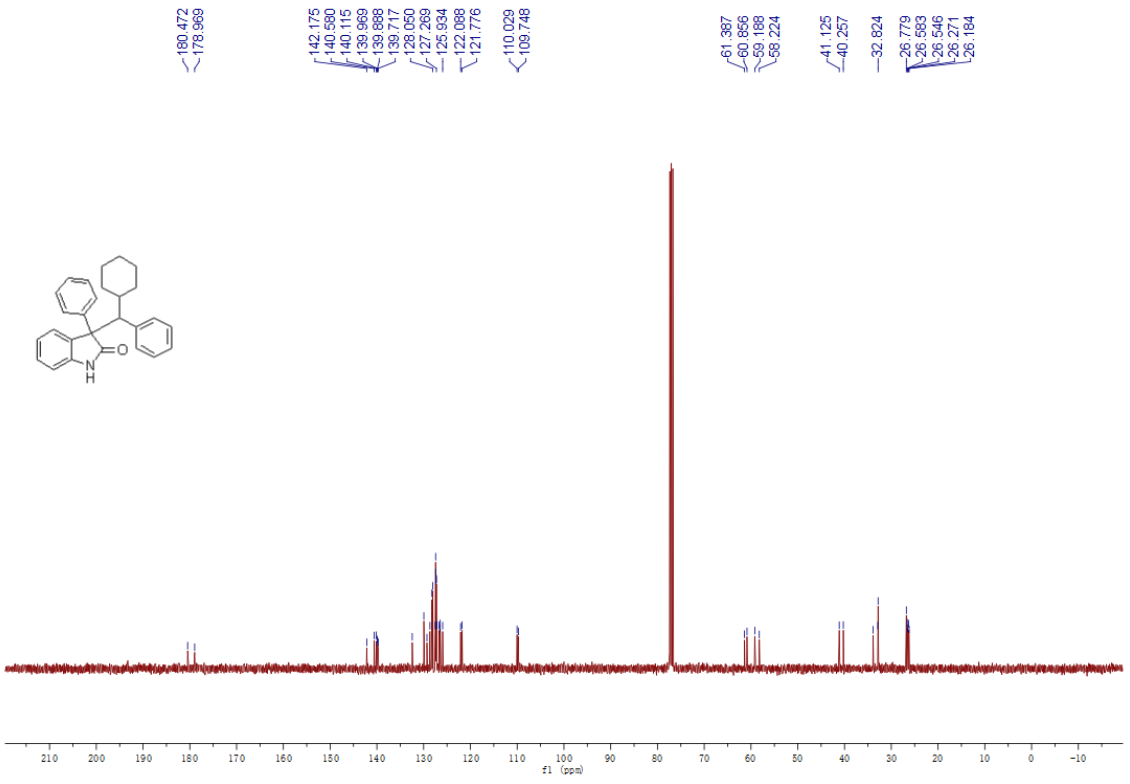

**$^{13}$C NMR spectrum of 3-phenyl-3-(1-phenylpropyl)indolin-2-one (60, d.r. = 1 : 1):**



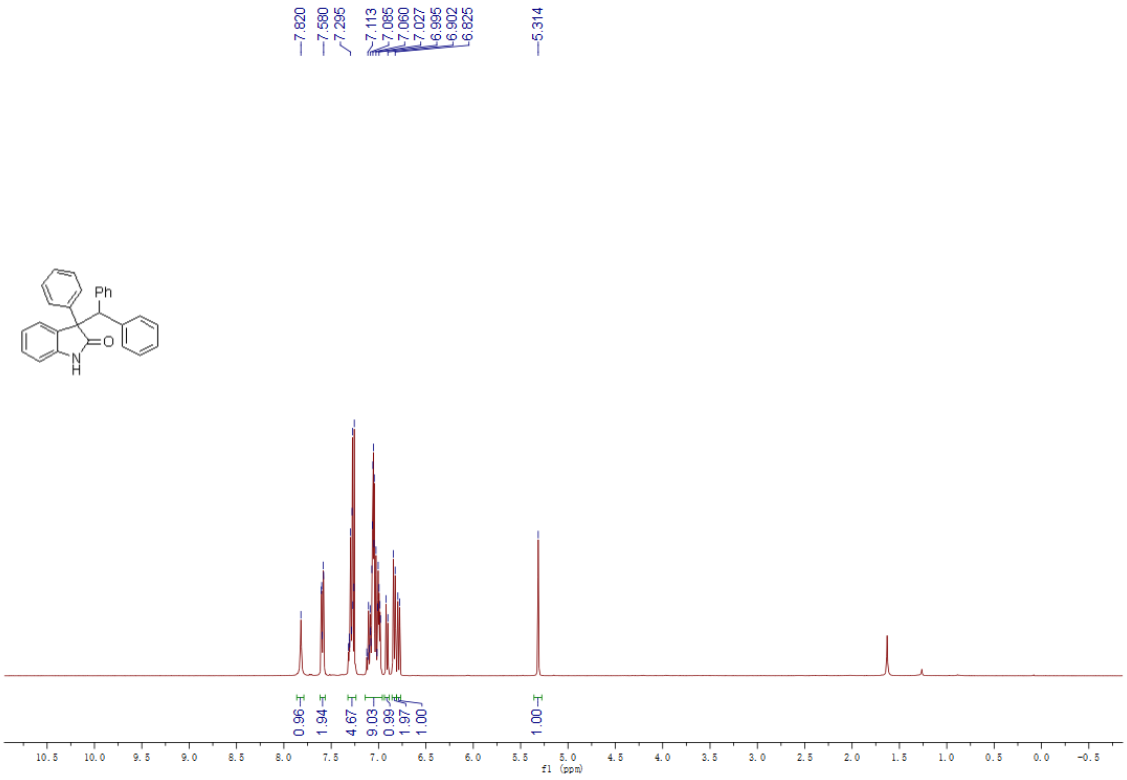
**$^{1}$H NMR spectrum of 3-(cyclohexyl(phenyl)methyl)-3-phenylindolin-2-one (61, d.r. = 1 : 1):**



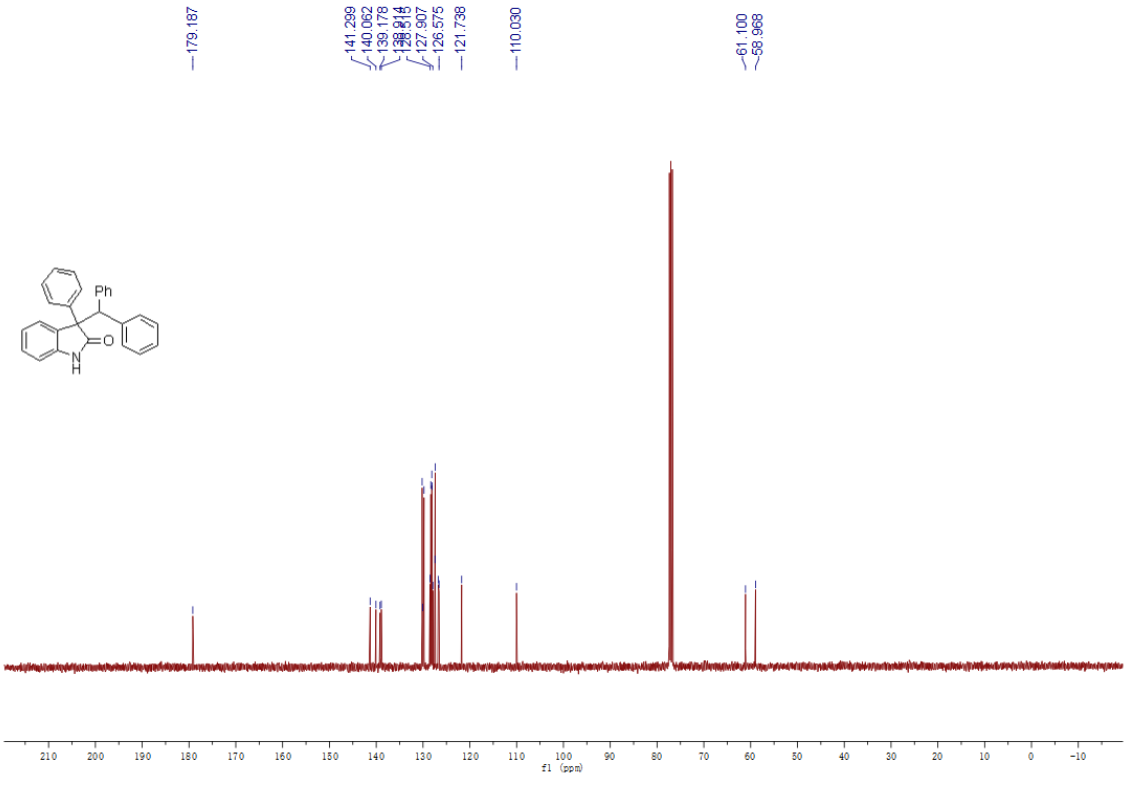
**$^{13}$C NMR spectrum of 3-(cyclohexyl(phenyl)methyl)-3-phenylindolin-2-one (61, d.r. = 1 : 1):**



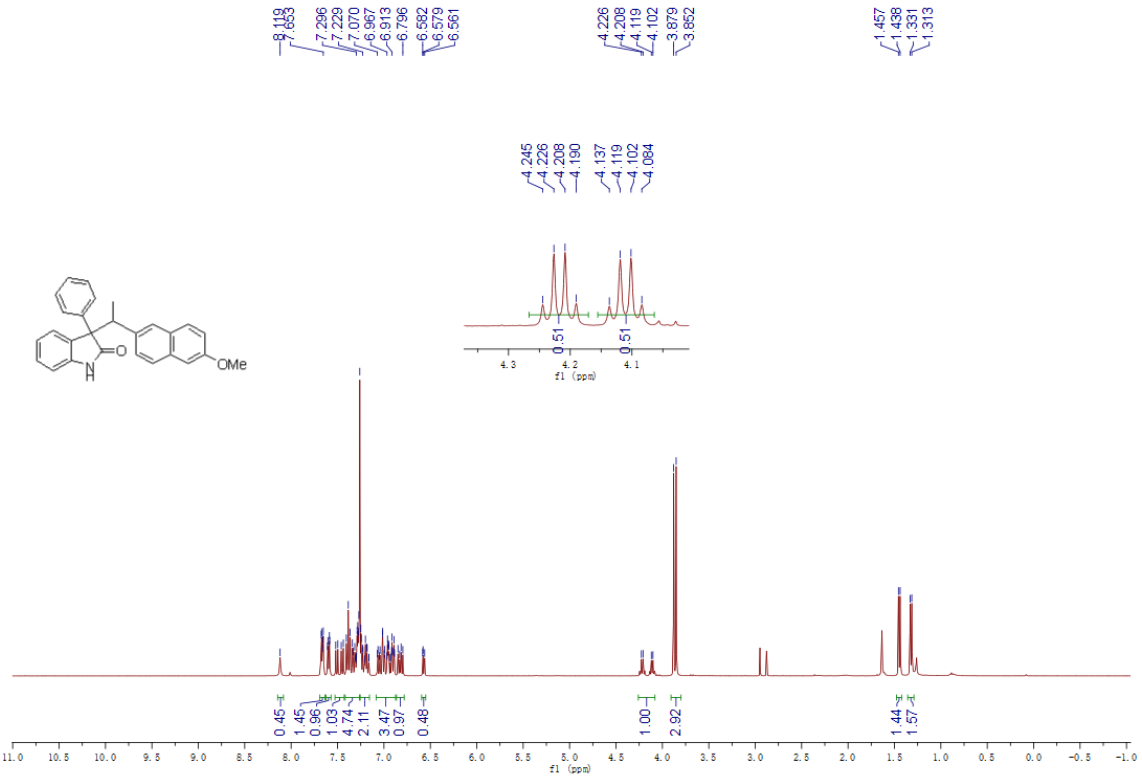
**$^{1}$H NMR spectrum of 3-benzhydryl-3-phenylindolin-2-one (62):**



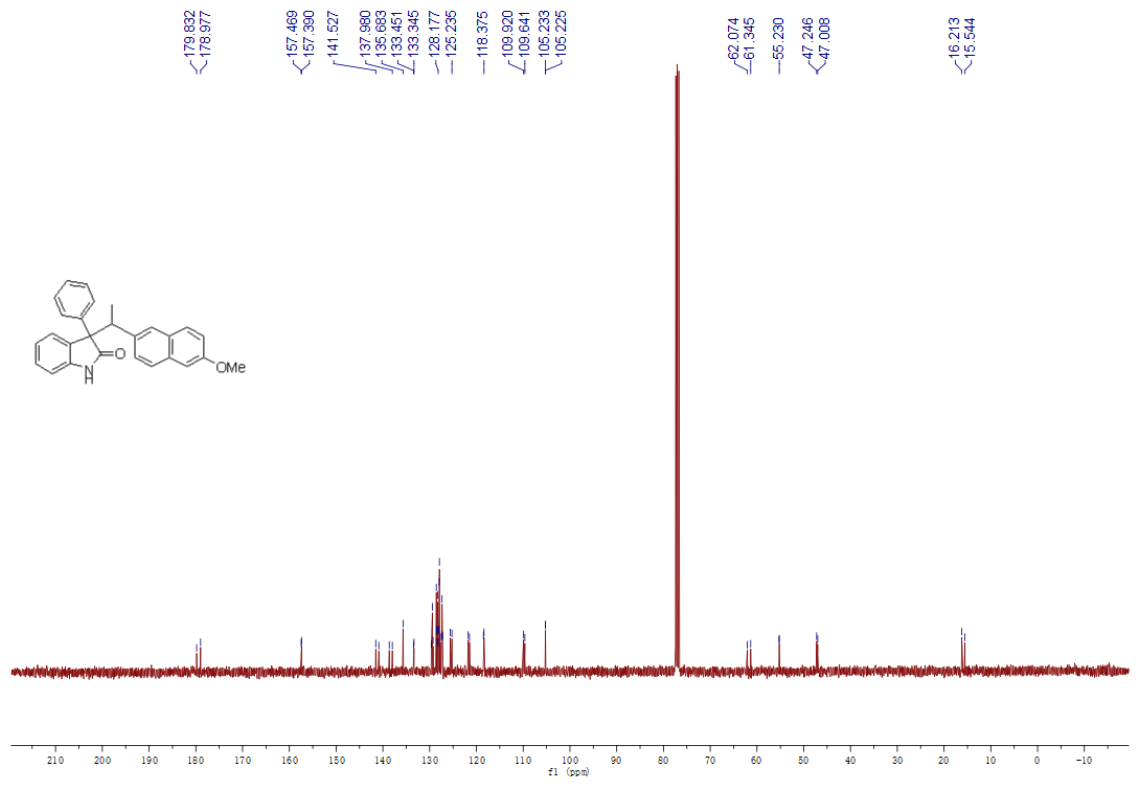

**$^{13}$C NMR spectrum of 3-benzhydryl-3-phenylindolin-2-one (62):**



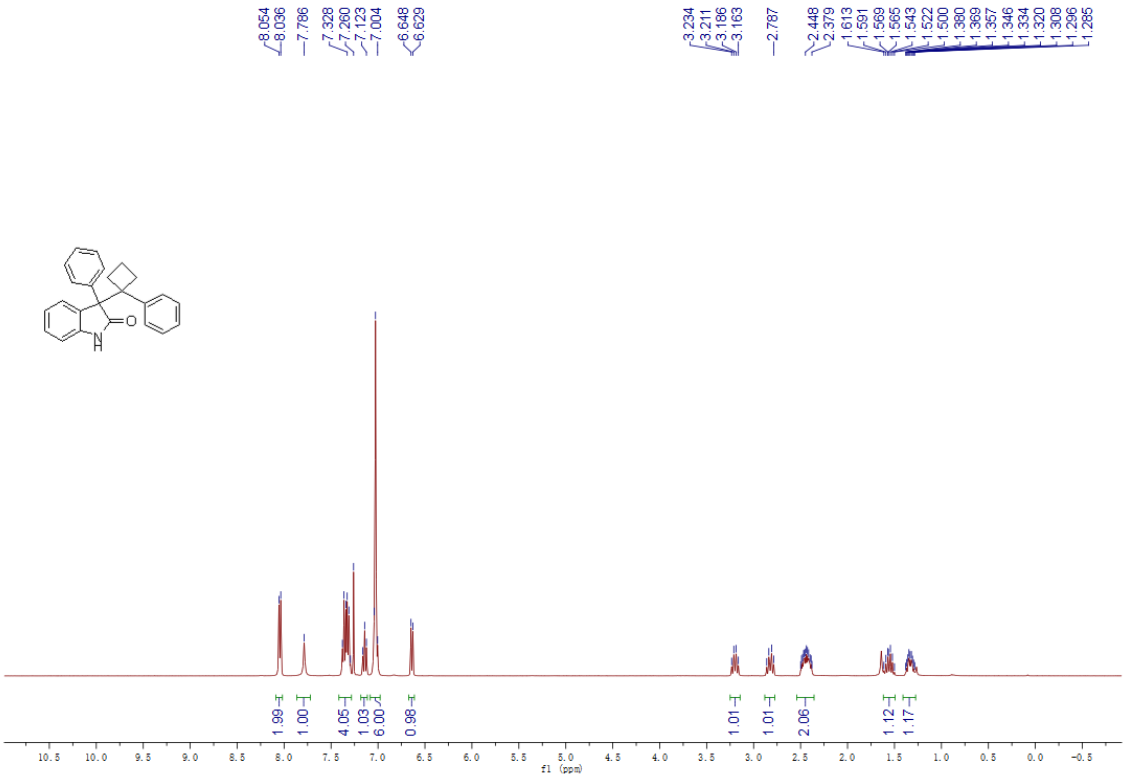
**$^{1}$H NMR spectrum of 3-(1-(6-methoxynaphthalen-2-yl)ethyl)-3-phenylindolin-2-one (63, d.r. = 1 : 1):**



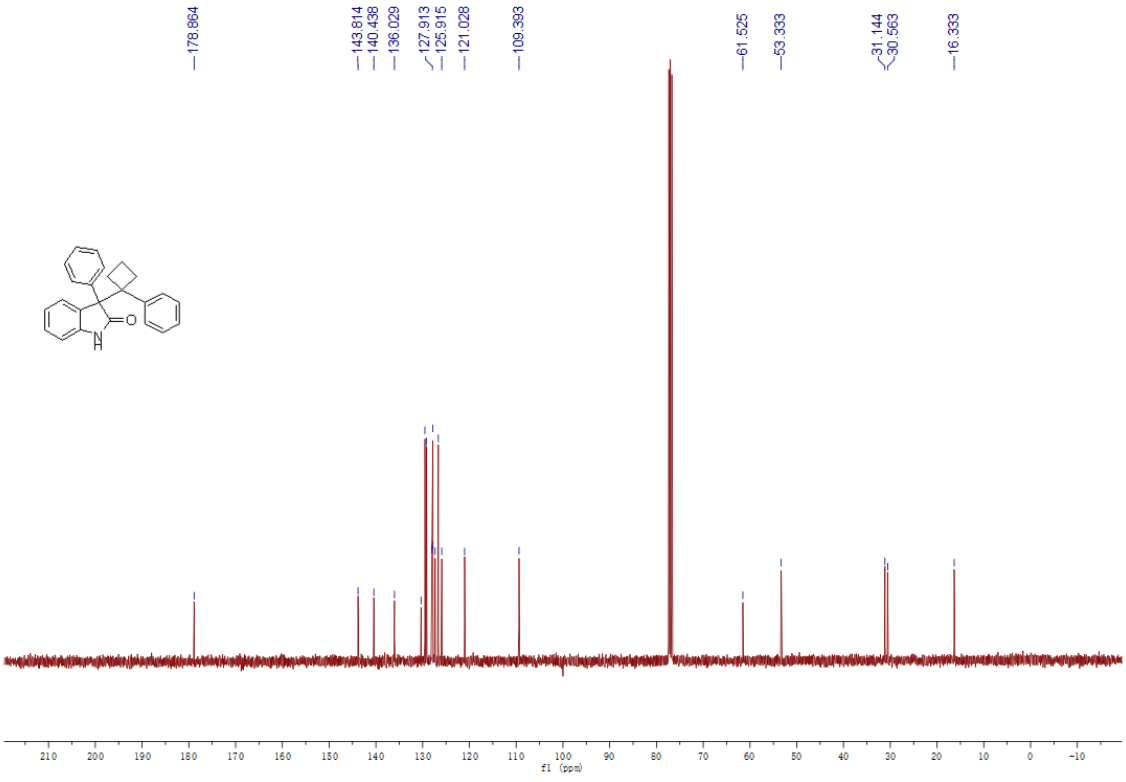

**$^{13}$C NMR spectrum of 3-(1-(6-methoxynaphthalen-2-yl)ethyl)-3-phenylindolin-2-one (63, d.r. = 1 : 1):**



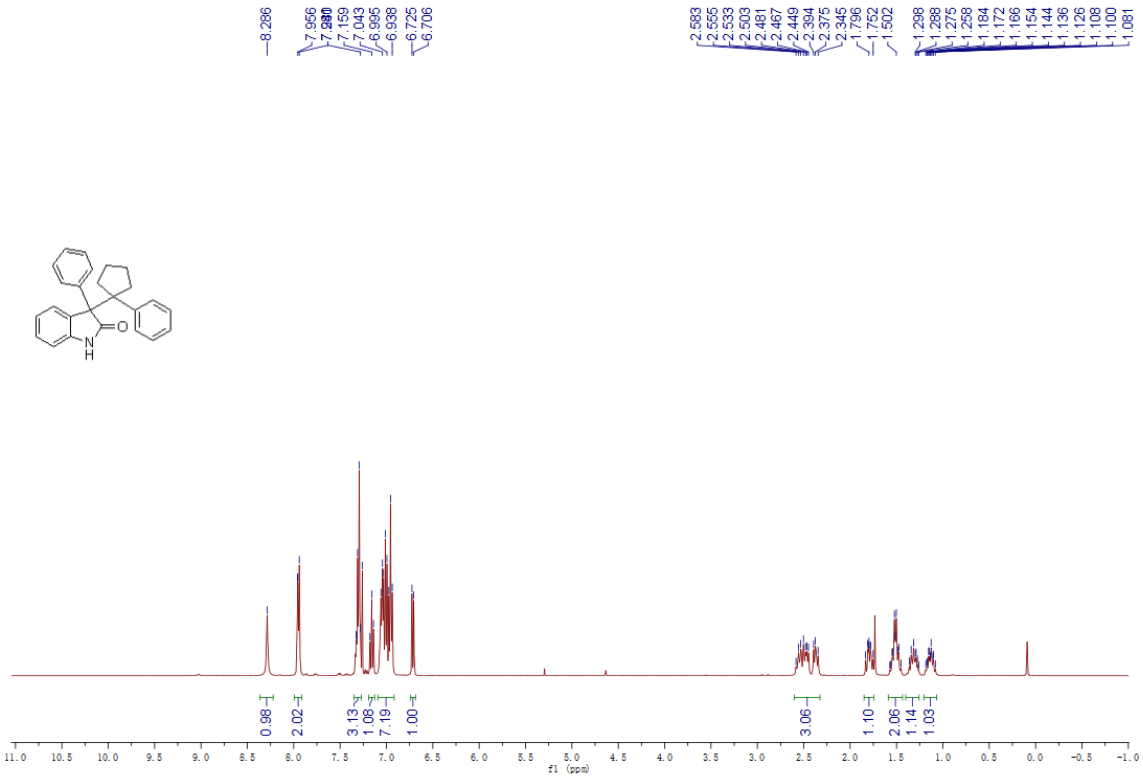
**$^{1}$H NMR spectrum of 3-phenyl-3-(1-phenylcyclobutyl)indolin-2-one (64):**



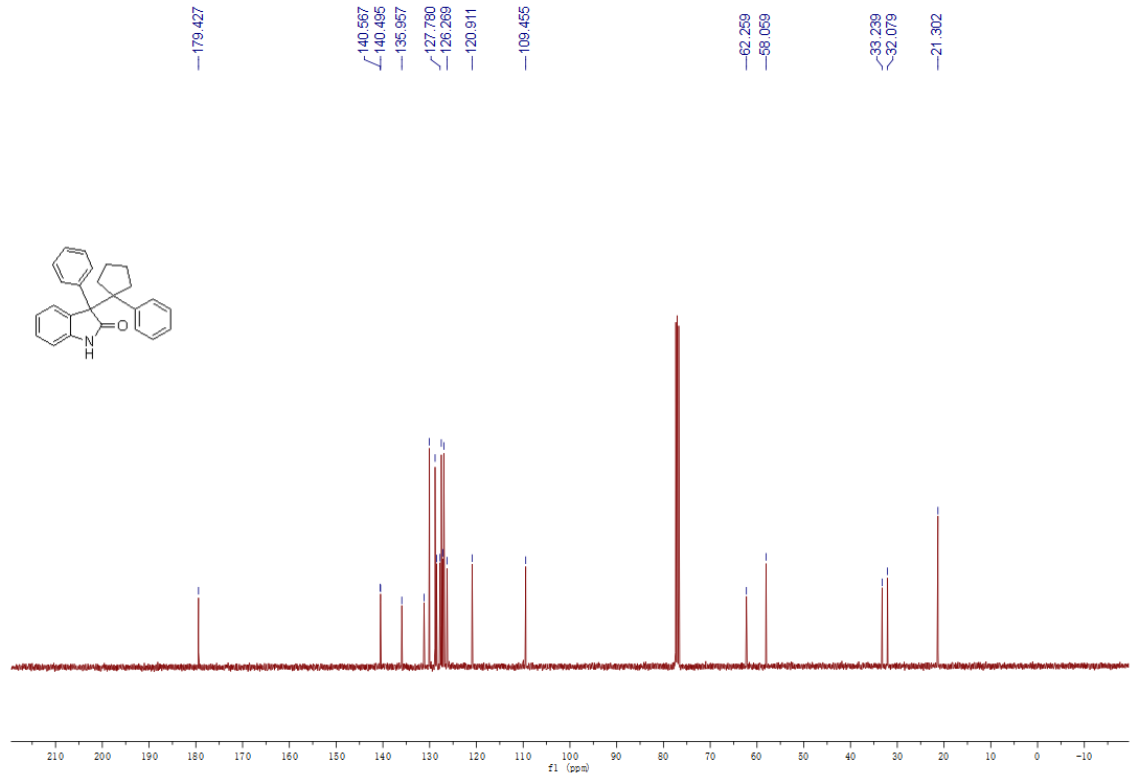

**$^{13}$C NMR spectrum of 3-phenyl-3-(1-phenylcyclobutyl)indolin-2-one (64):**



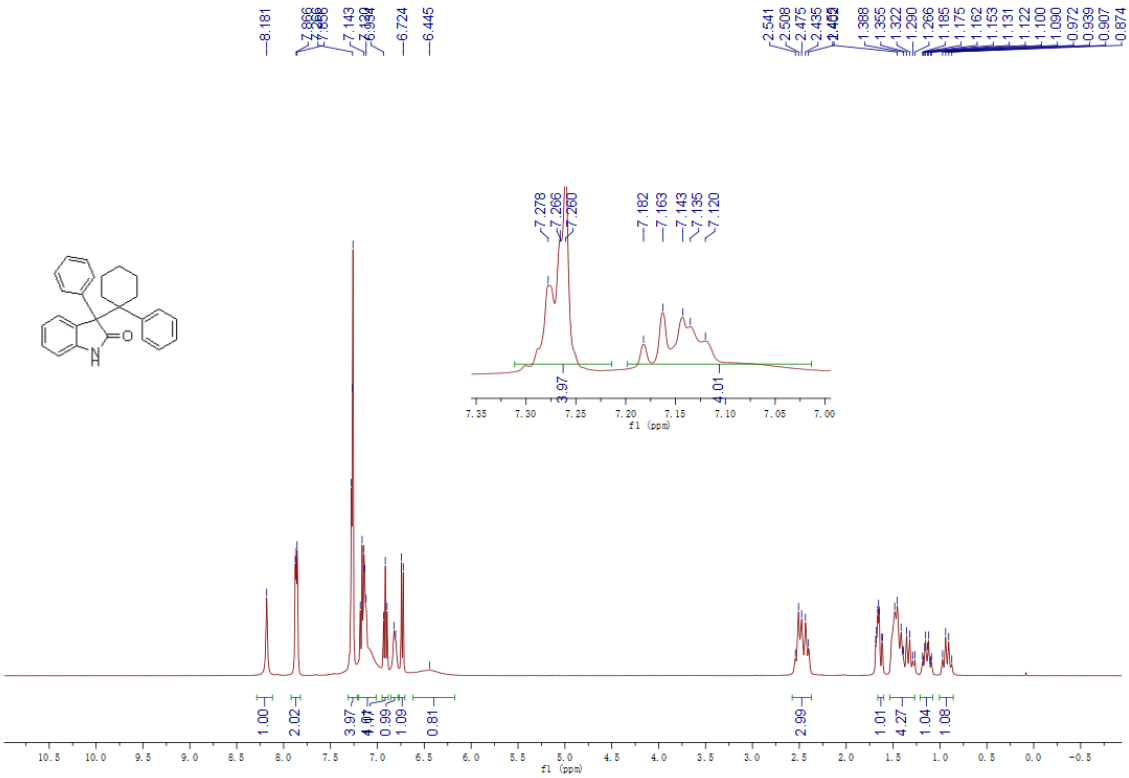
**$^{1}$H NMR spectrum of 3-phenyl-3-(1-phenylcyclopentyl)indolin-2-one (65):**



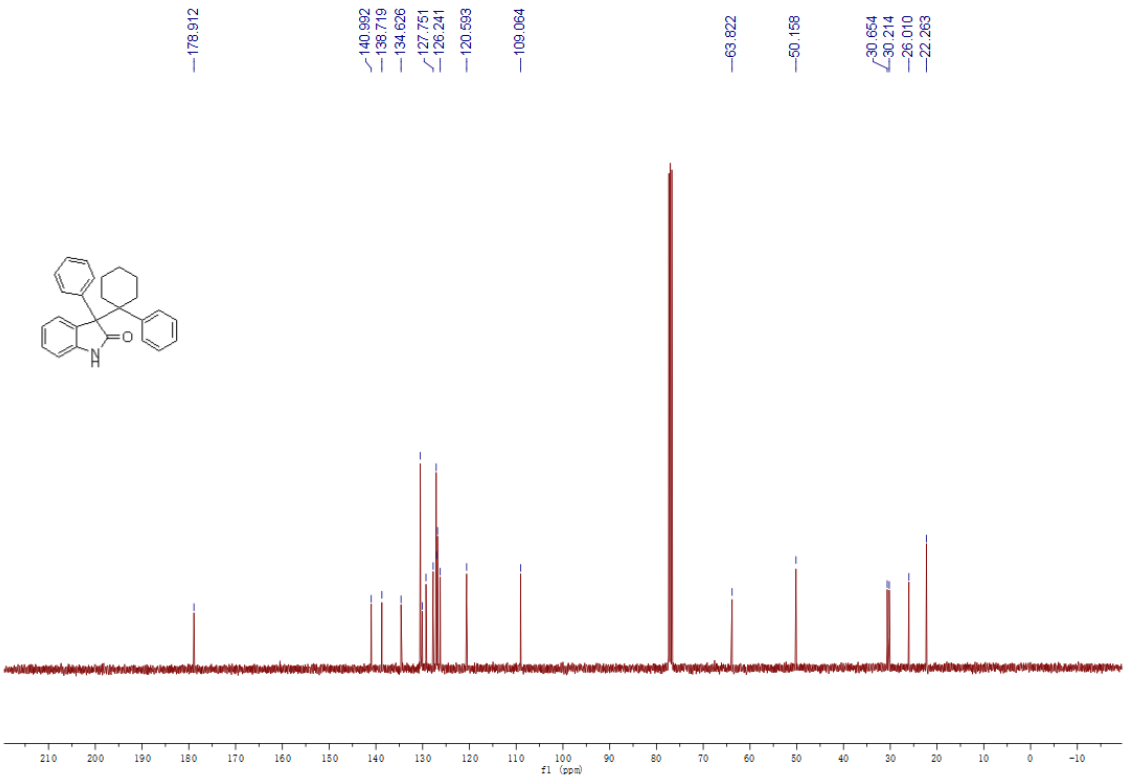

**$^{13}$C NMR spectrum of 3-phenyl-3-(1-phenylcyclopentyl)indolin-2-one (65):**



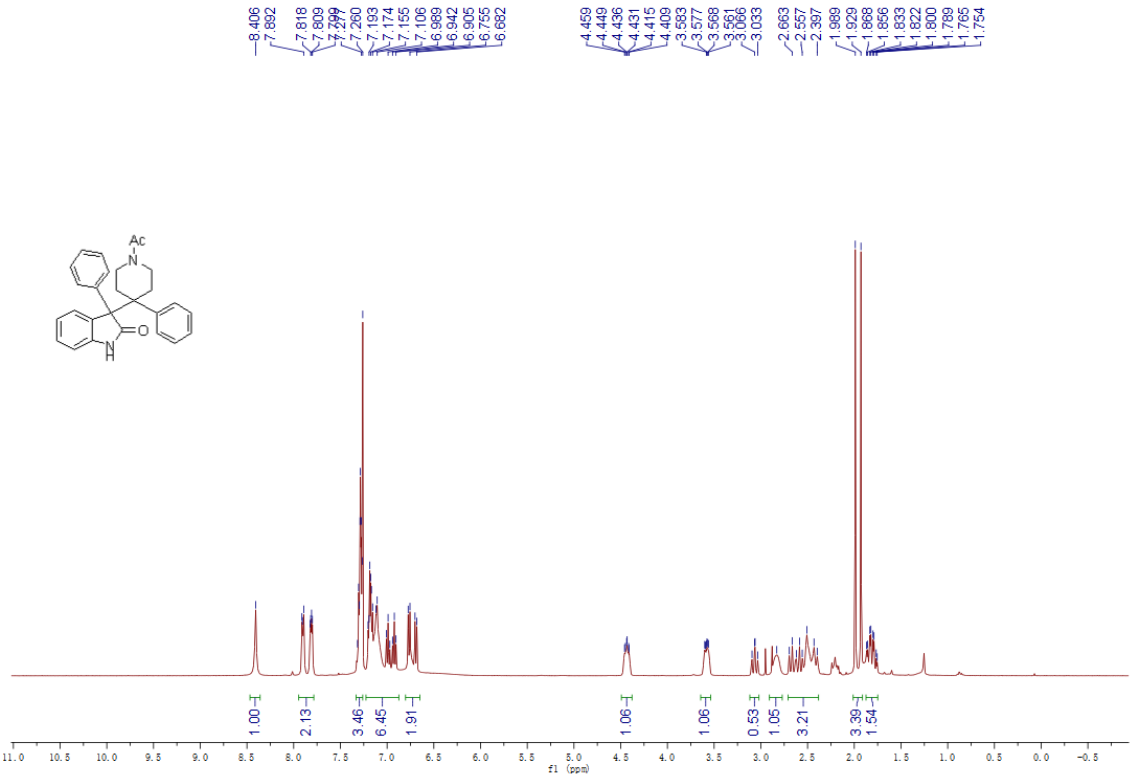
**$^{1}$H NMR spectrum of 3-phenyl-3-(1-phenylcyclohexyl)indolin-2-one (66):**



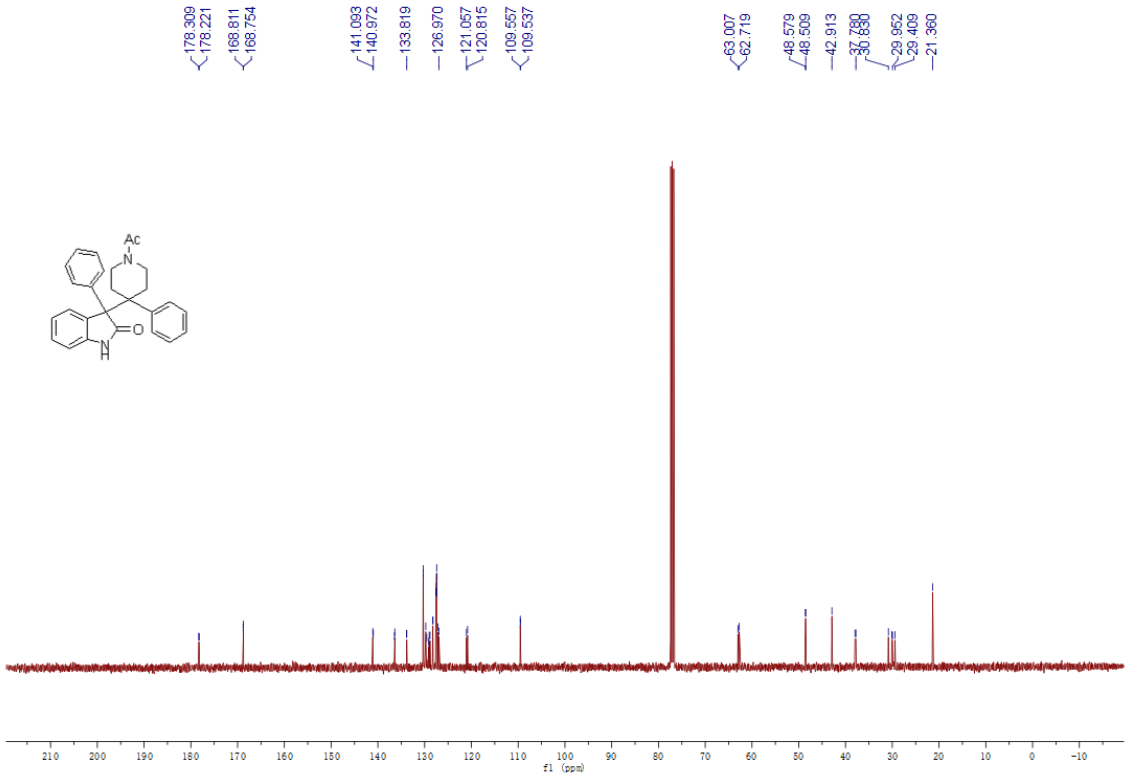
**$^{13}$C NMR spectrum of 3-phenyl-3-(1-phenylcyclohexyl)indolin-2-one (66):**



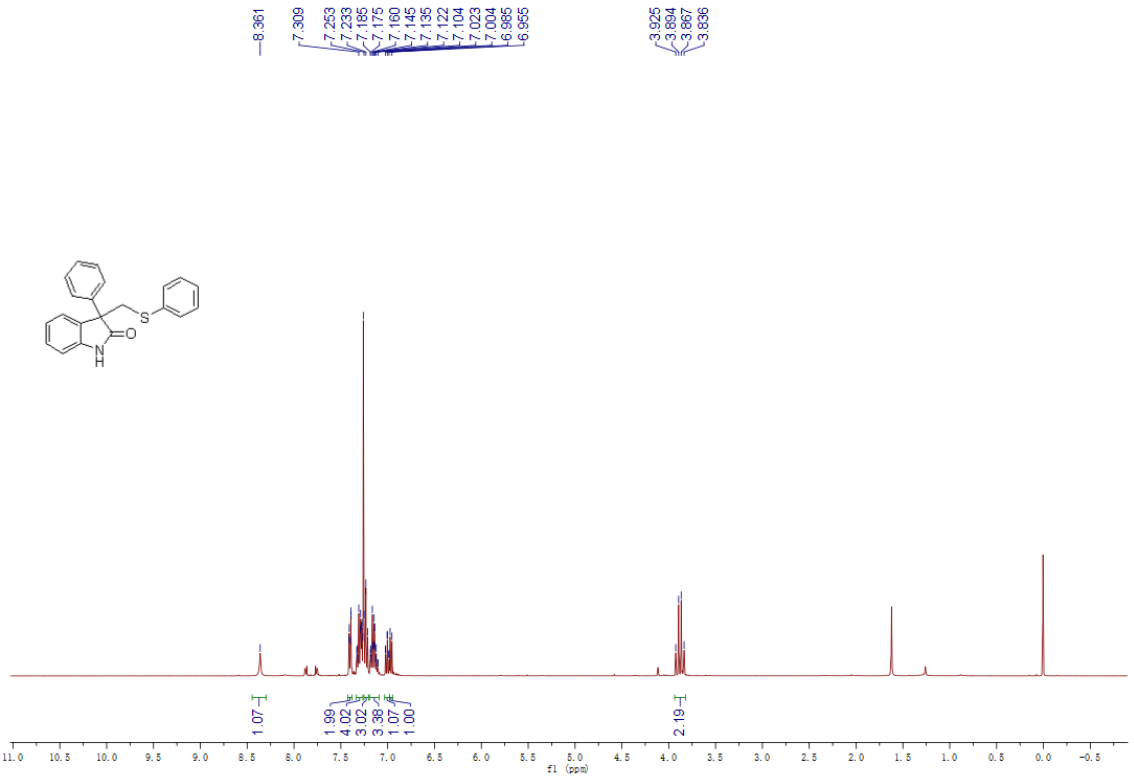
**$^{1}$H NMR spectrum of 3-(1-acetyl-4-phenylpiperidin-4-yl)-3-phenylindolin-2-one (67):**



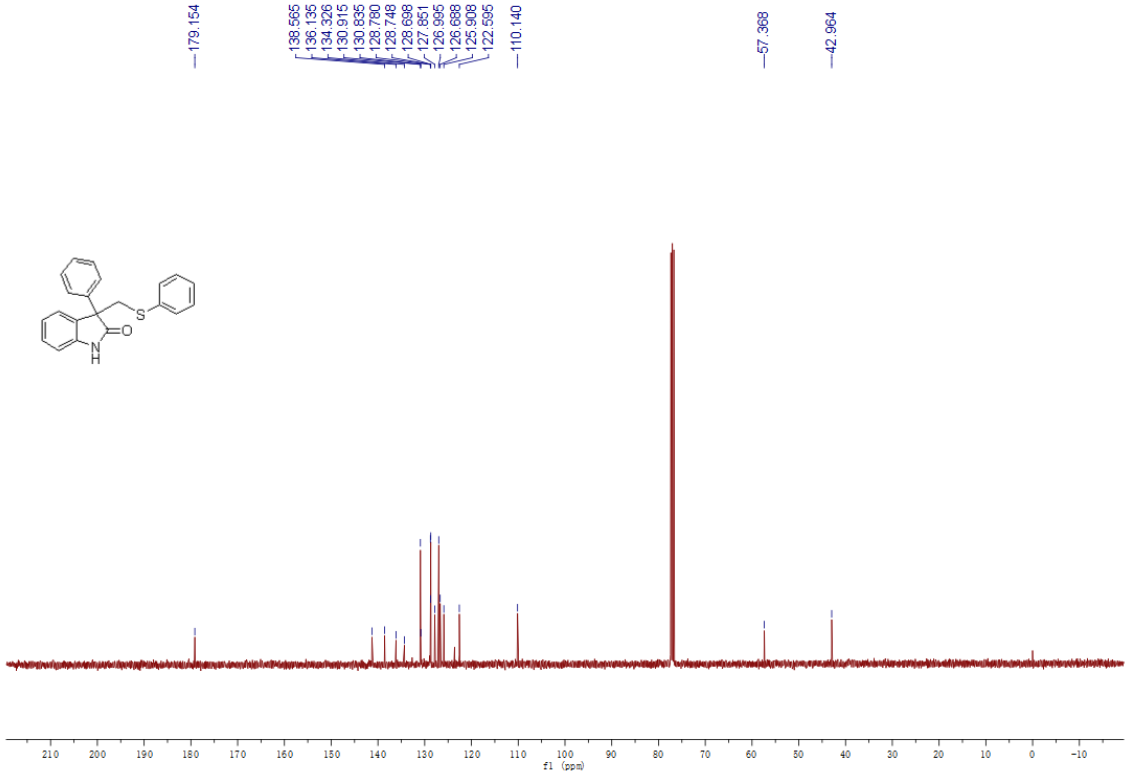

**$^{13}$C NMR spectrum of 3-(1-acetyl-4-phenylpiperidin-4-yl)-3-phenylindolin-2-one (67):**



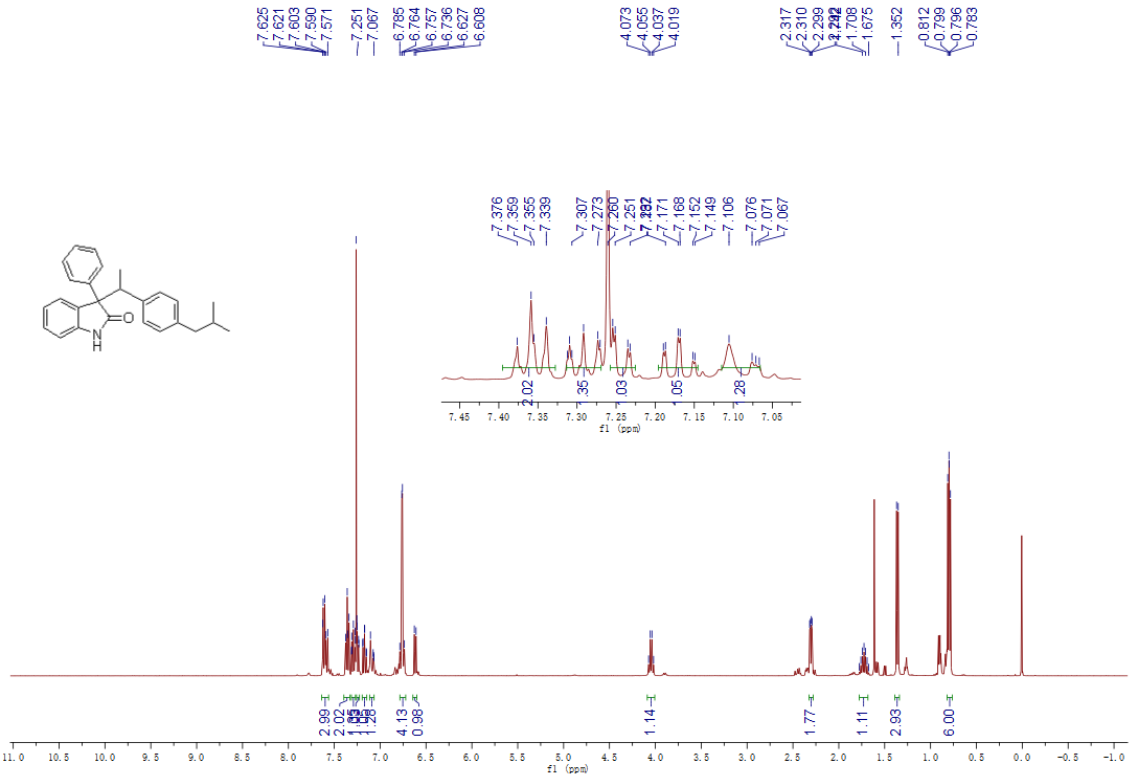
**$^{1}$H NMR spectrum of 3-phenyl-3-((phenylthio)methyl)indolin-2-one (68):**



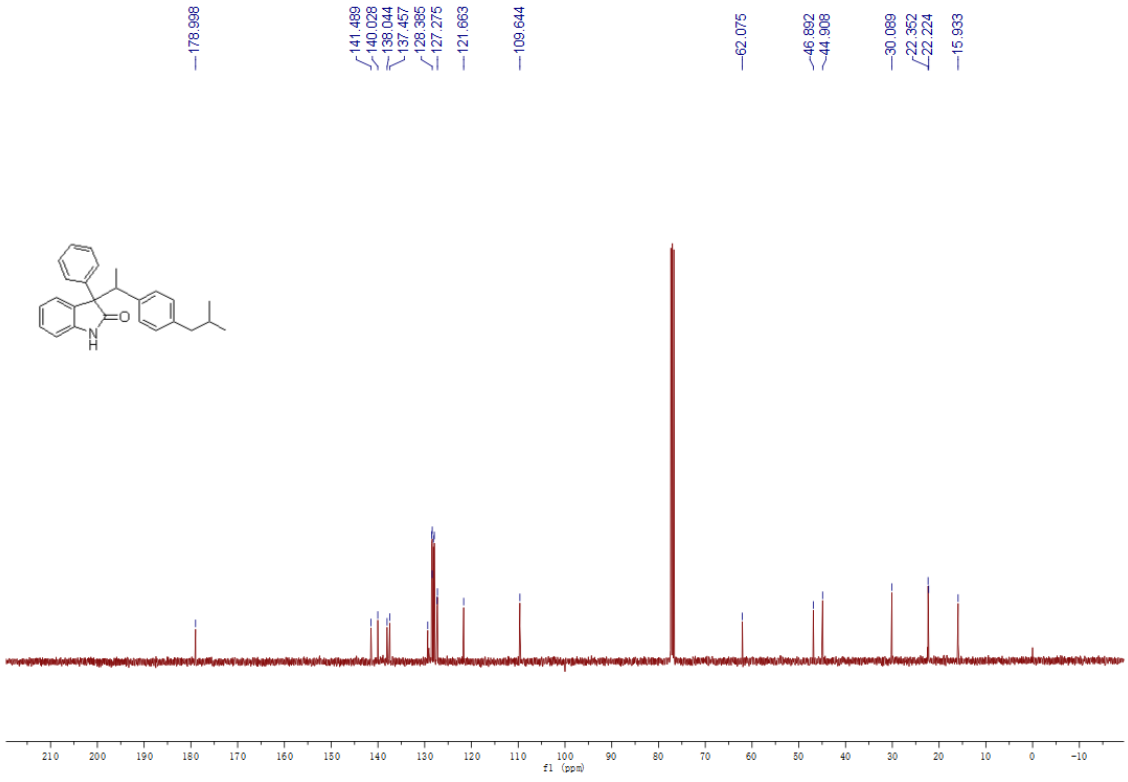

**$^{13}$C NMR spectrum of 3-phenyl-3-((phenylthio)methyl)indolin-2-one (68):**



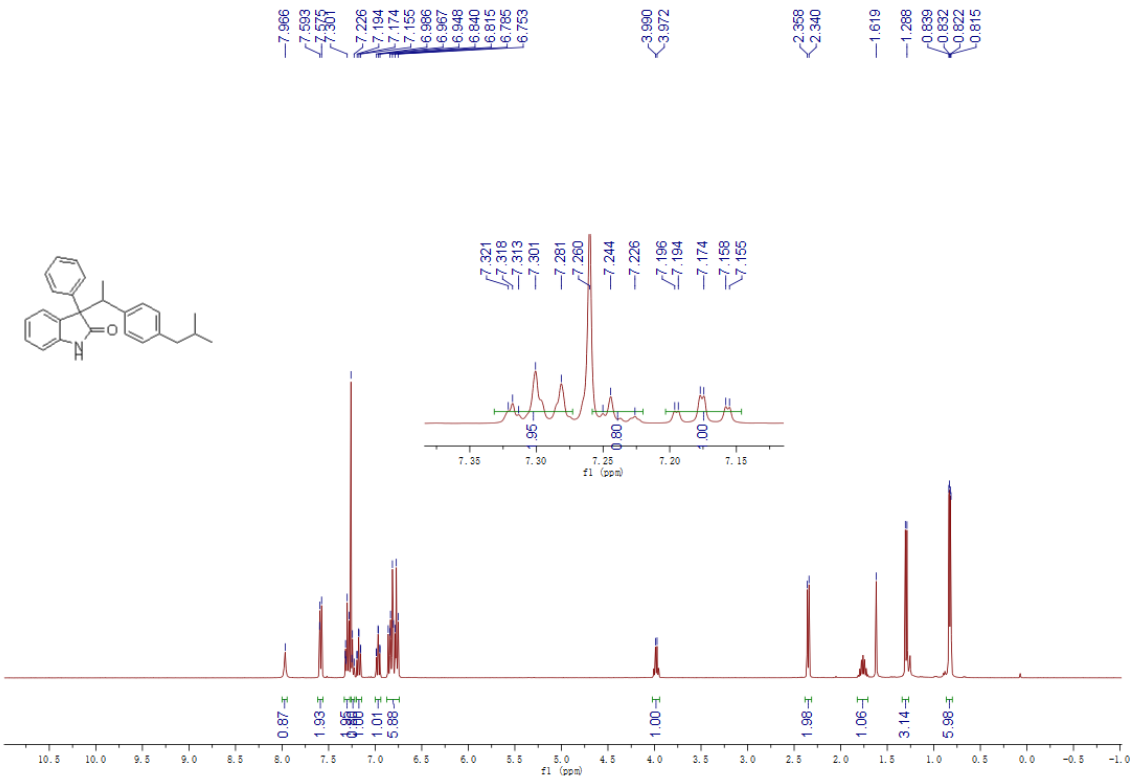
**$^{1}$H NMR spectrum of 3-(1-(4-isobutylphenyl)ethyl)-3-phenylindolin-2-one (69, d.r. = 1 : 1):**



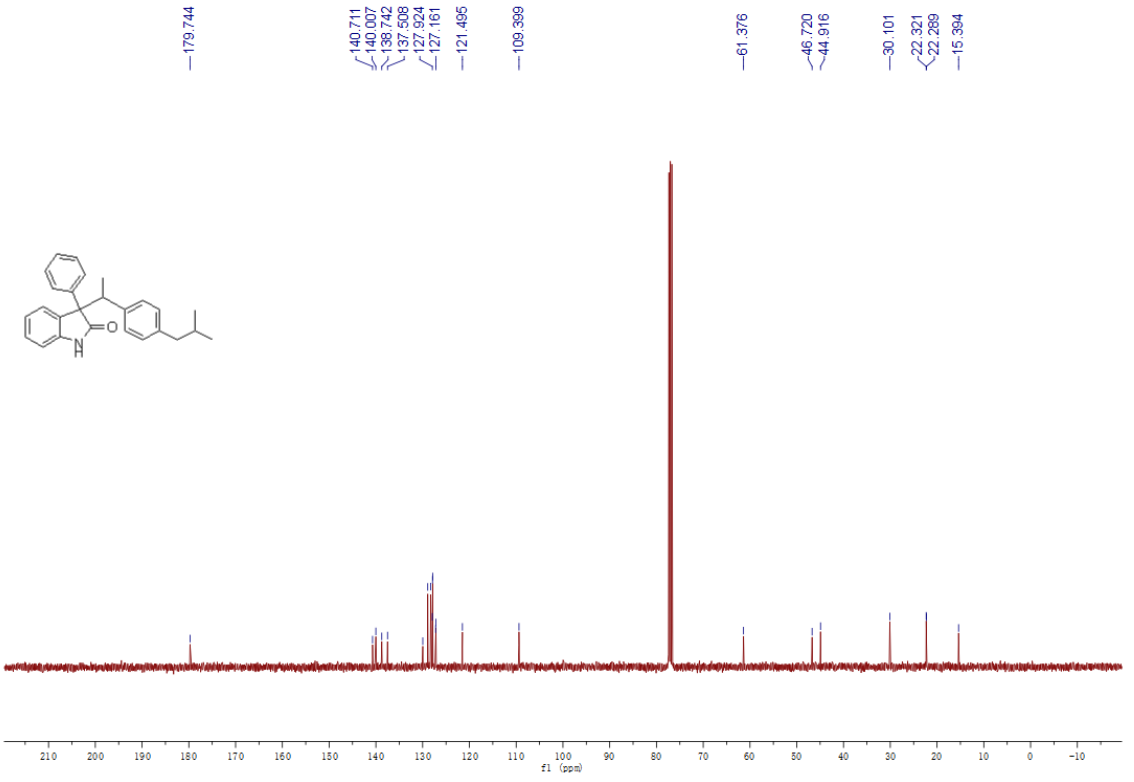
**$^{13}$C NMR spectrum of 3-(1-(4-isobutylphenyl)ethyl)-3-phenylindolin-2-one (69, d.r. = 1 : 1):**



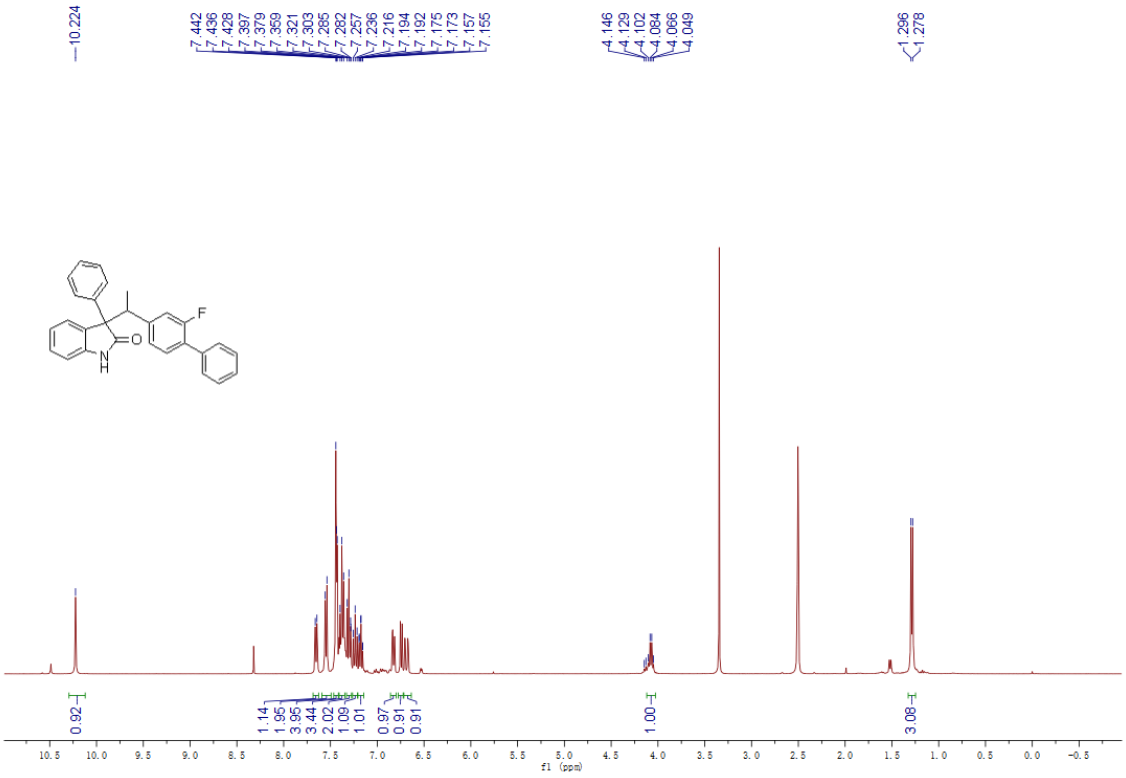
**$^{1}$H NMR spectrum of 3-(1-(4-isobutylphenyl)ethyl)-3-phenylindolin-2-one (69, d.r. = 1 : 1):**



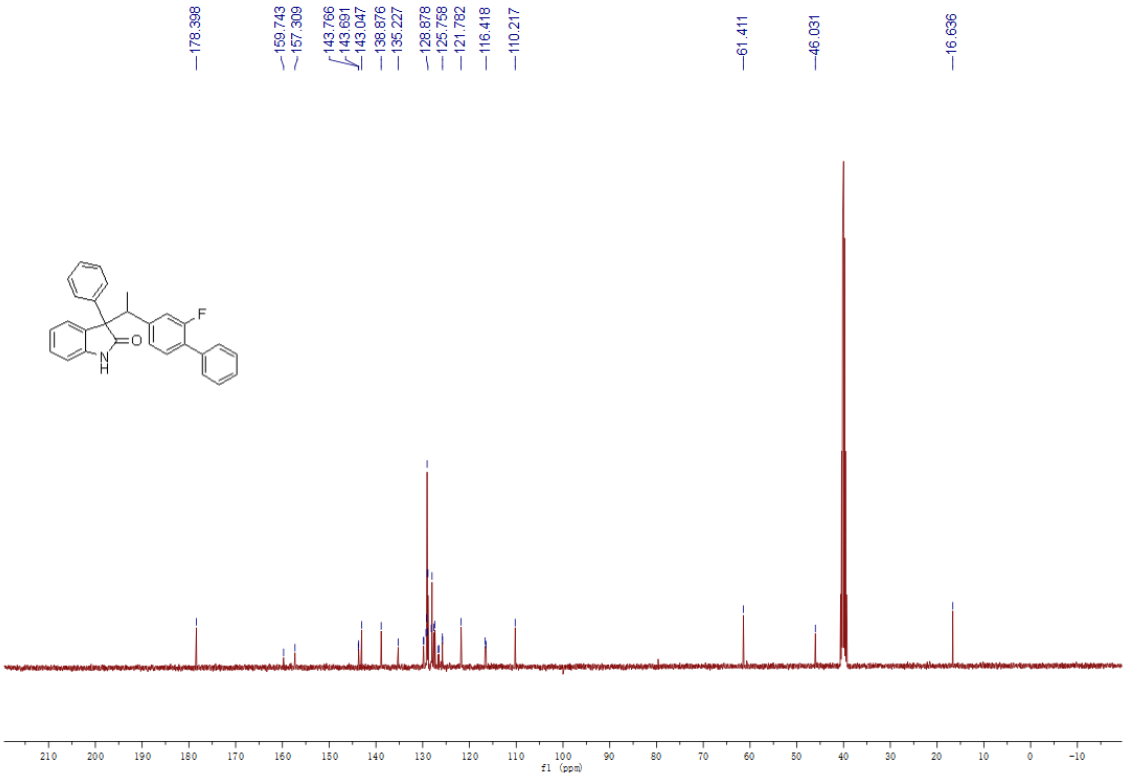

**$^{13}$C NMR spectrum of 3-(1-(4-isobutylphenyl)ethyl)-3-phenylindolin-2-one (69, d.r. = 1 : 1):**



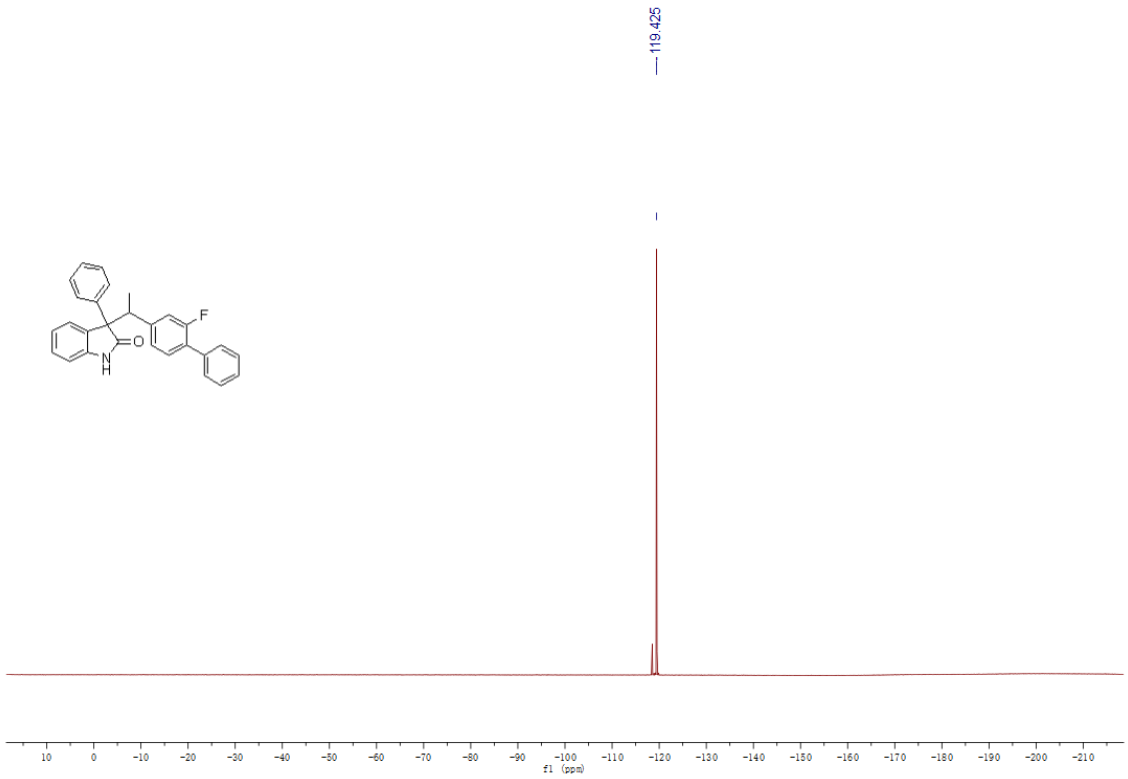
**$^{1}$H NMR spectrum of 3-(1-(2-fluoro-[1,1'-biphenyl]-4-yl)ethyl)-3-phenylindolin-2-one (70, d.r. = 1 : 1):**



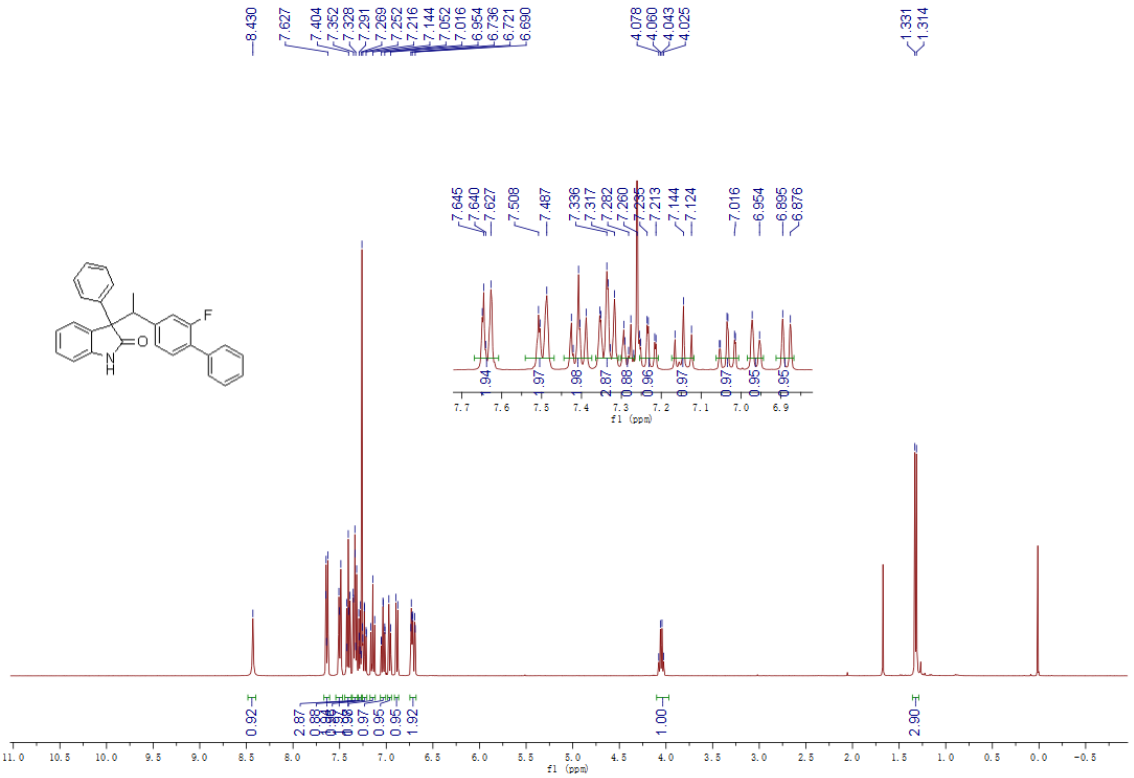

**$^{13}$C NMR spectrum of 3-(1-(2-fluoro-[1,1'-biphenyl]-4-yl)ethyl)-3-phenylindolin-2-one (70, d.r. = 1 : 1):**



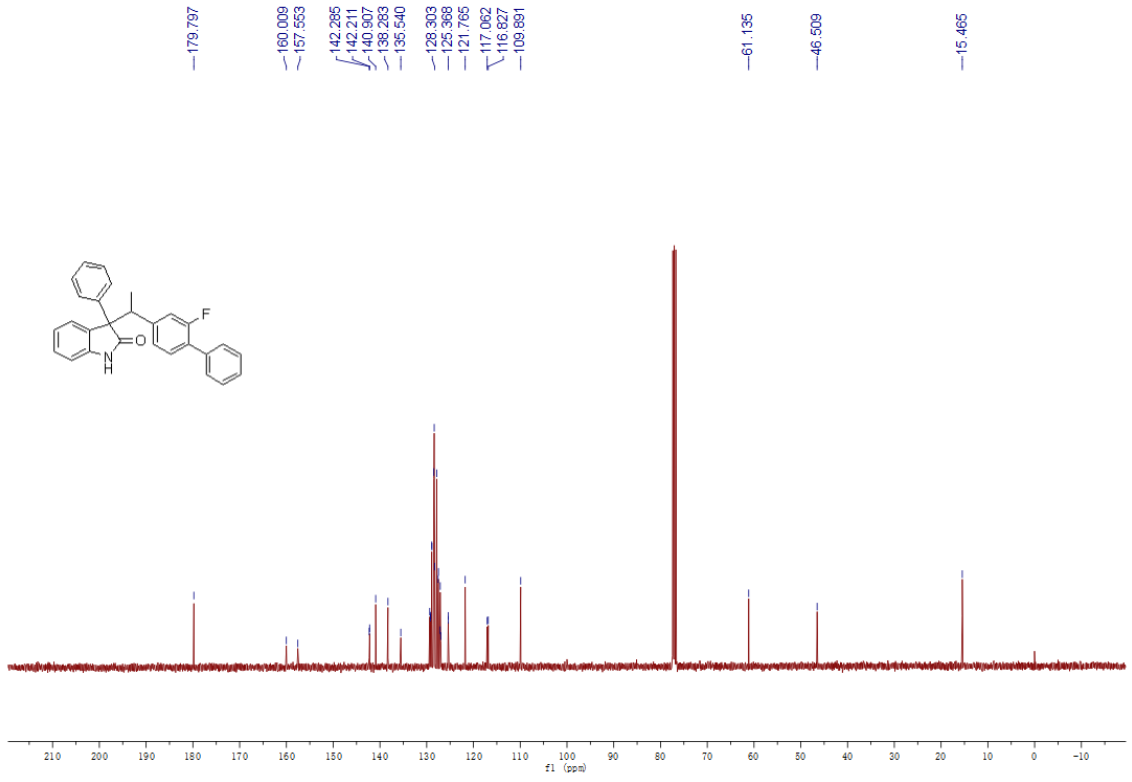
**$^{19}$F NMR spectrum of 3-(1-(2-fluoro-[1,1'-biphenyl]-4-yl)ethyl)-3-phenylindolin-2-one (70, d.r. = 1 : 1):**



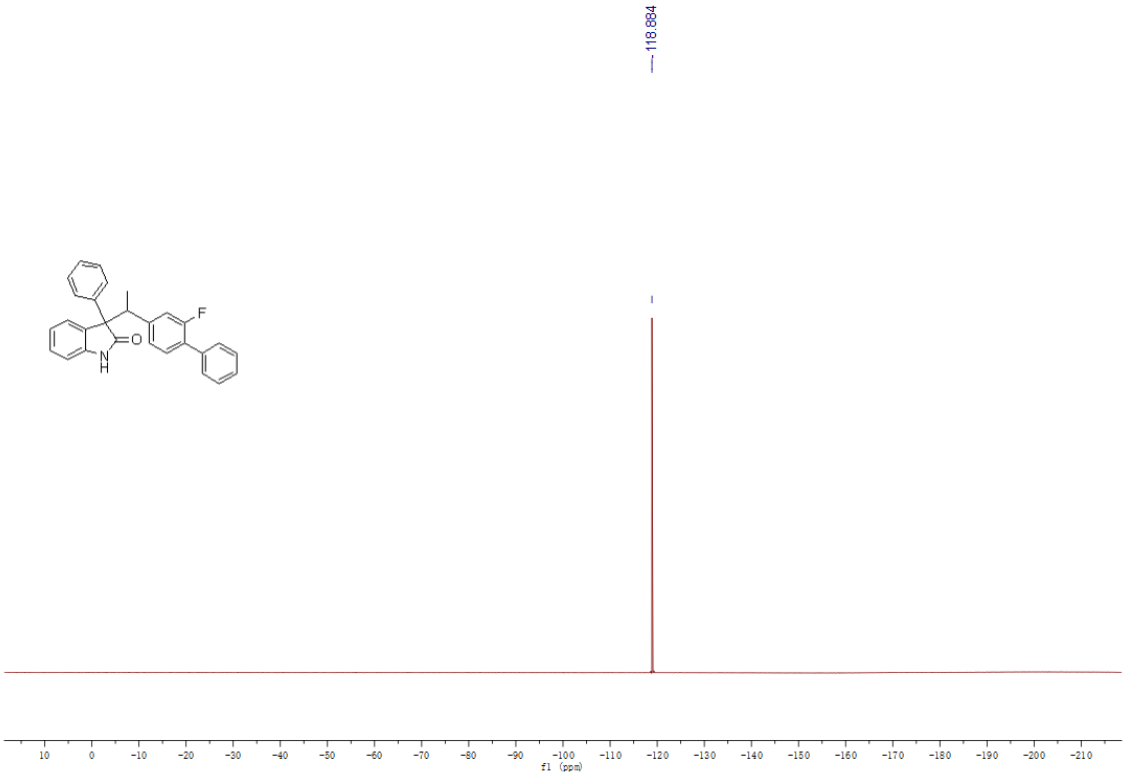
**$^{1}$H NMR spectrum of 3-(1-(2-fluoro-[1,1'-biphenyl]-4-yl)ethyl)-3-phenylindolin-2-one (70, d.r. = 1 : 1):**



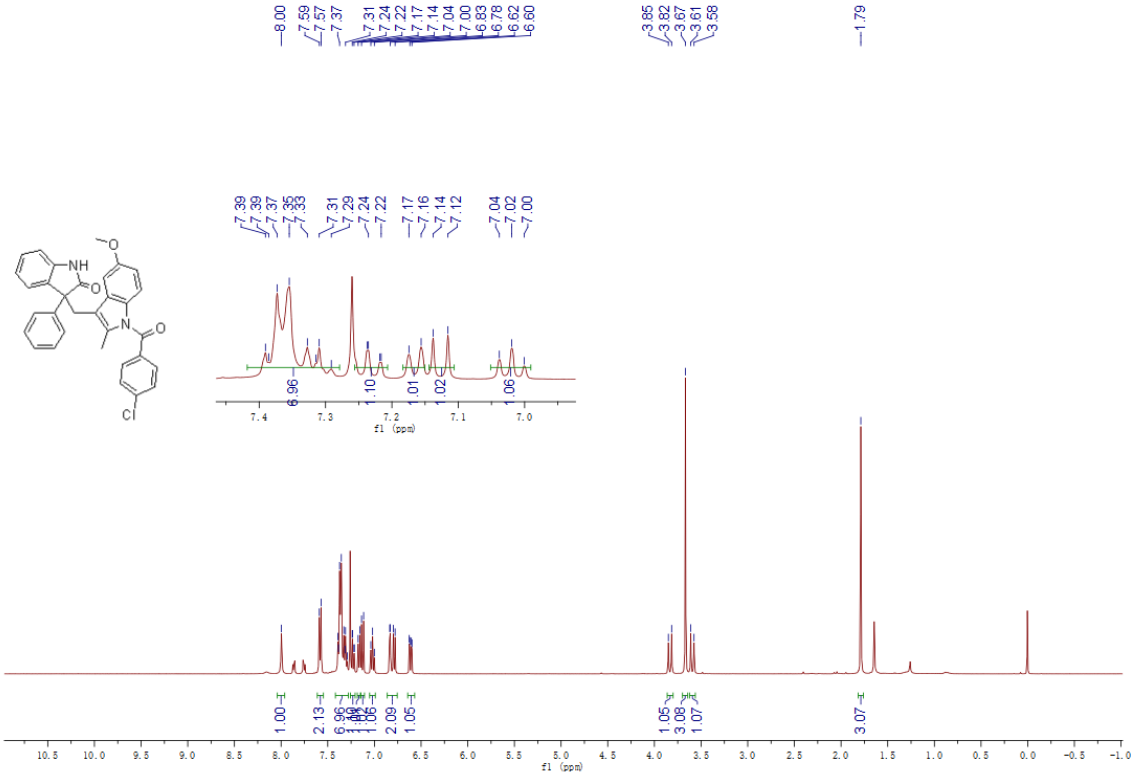

**$^{13}$C NMR spectrum of 3-(1-(2-fluoro-[1,1'-biphenyl]-4-yl)ethyl)-3-phenylindolin-2-one (70, d.r. = 1 : 1):**



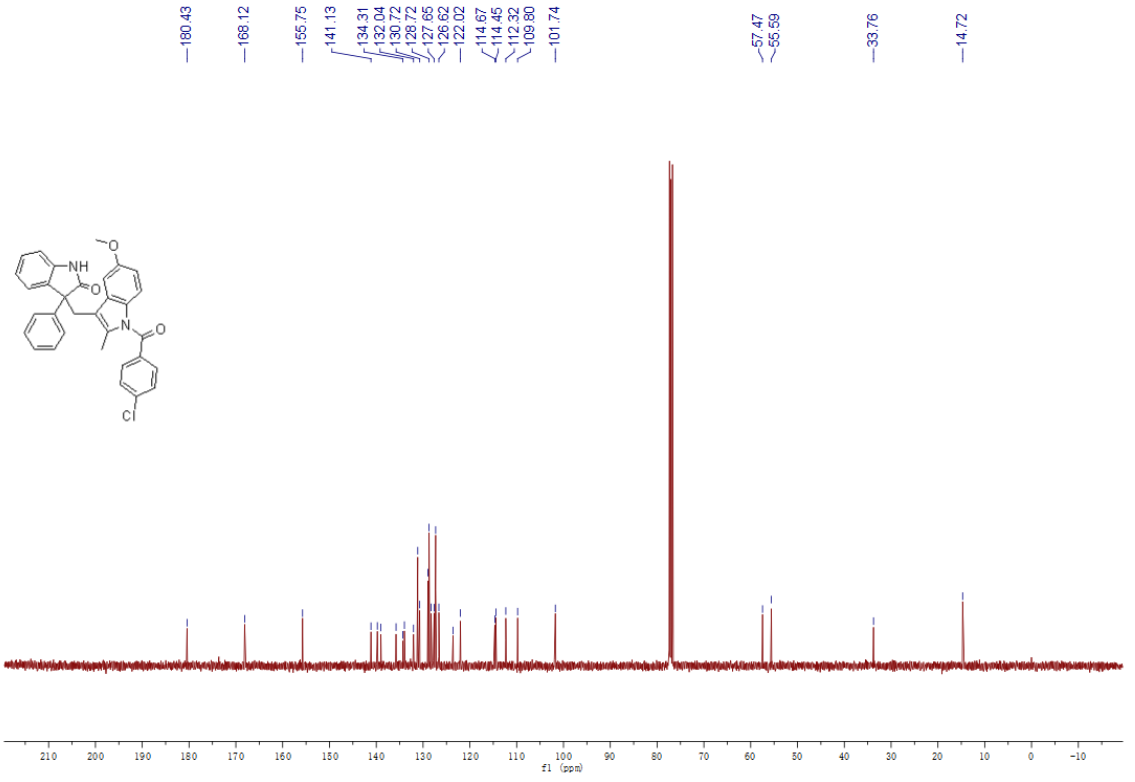
**$^{19}$F NMR spectrum of 3-(1-(2-fluoro-[1,1'-biphenyl]-4-yl)ethyl)-3-phenylindolin-2-one (70, d.r. = 1 : 1):**



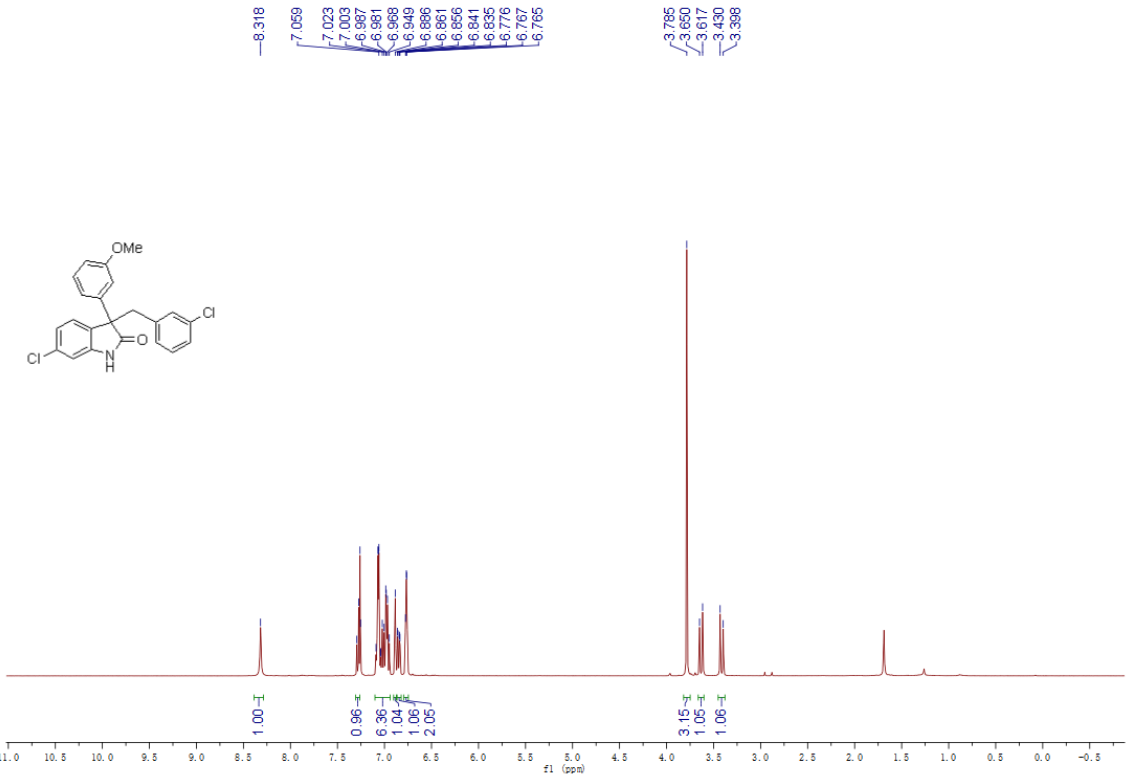
**$^{1}$H NMR spectrum of 3-((1-(4-chlorobenzoyl)-5-methoxy-2-methyl-1H-indol-3-yl)methyl)-3-phenylindolin-2-one (71):**



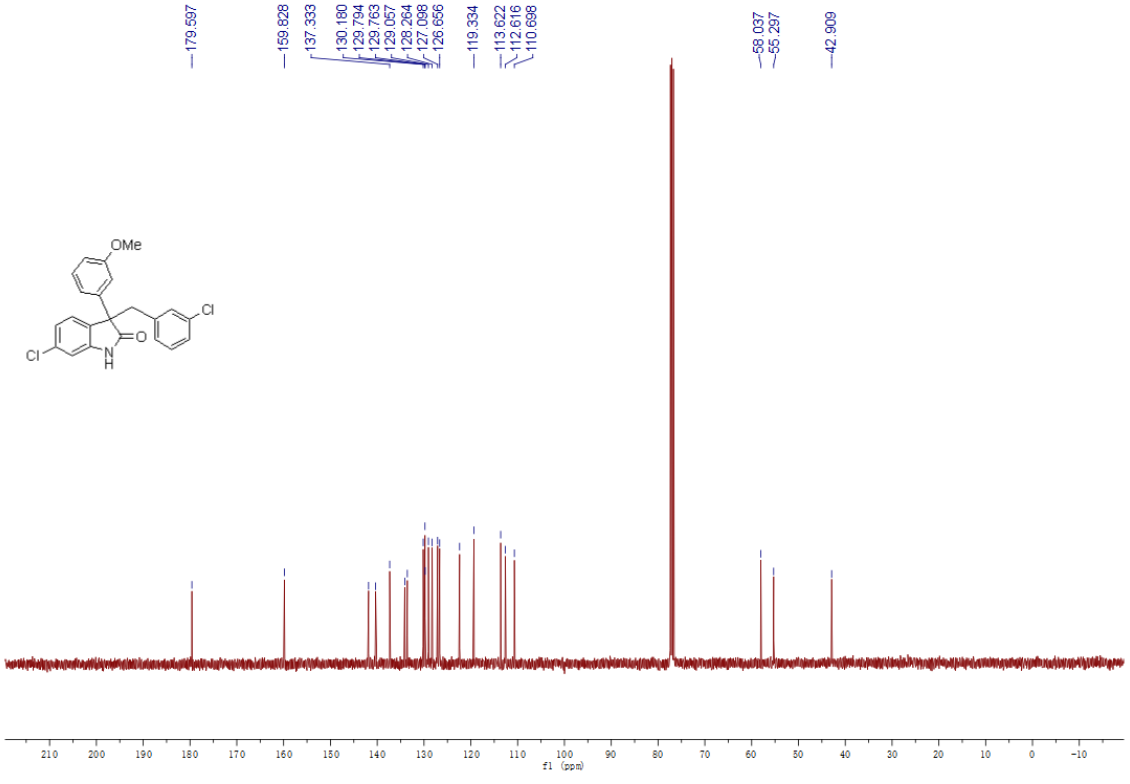

**$^{13}$C NMR spectrum of 3-((1-(4-chlorobenzoyl)-5-methoxy-2-methyl-1H-indol-3-yl)methyl)-3-phenylindolin-2-one (71):**



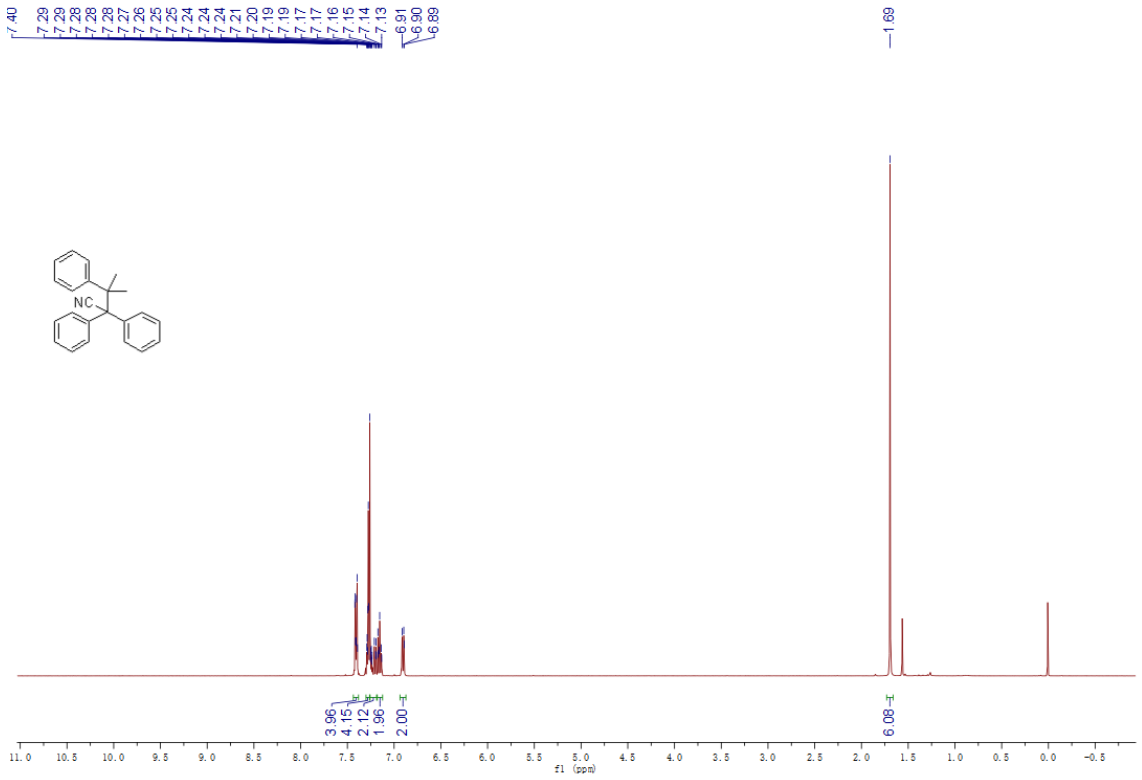
**$^{1}$H NMR spectrum of 6-chloro-3-(2-(3-chlorophenyl)propan-2-yl)-3-(3-methoxyphenyl)indolin-2-one (72):**



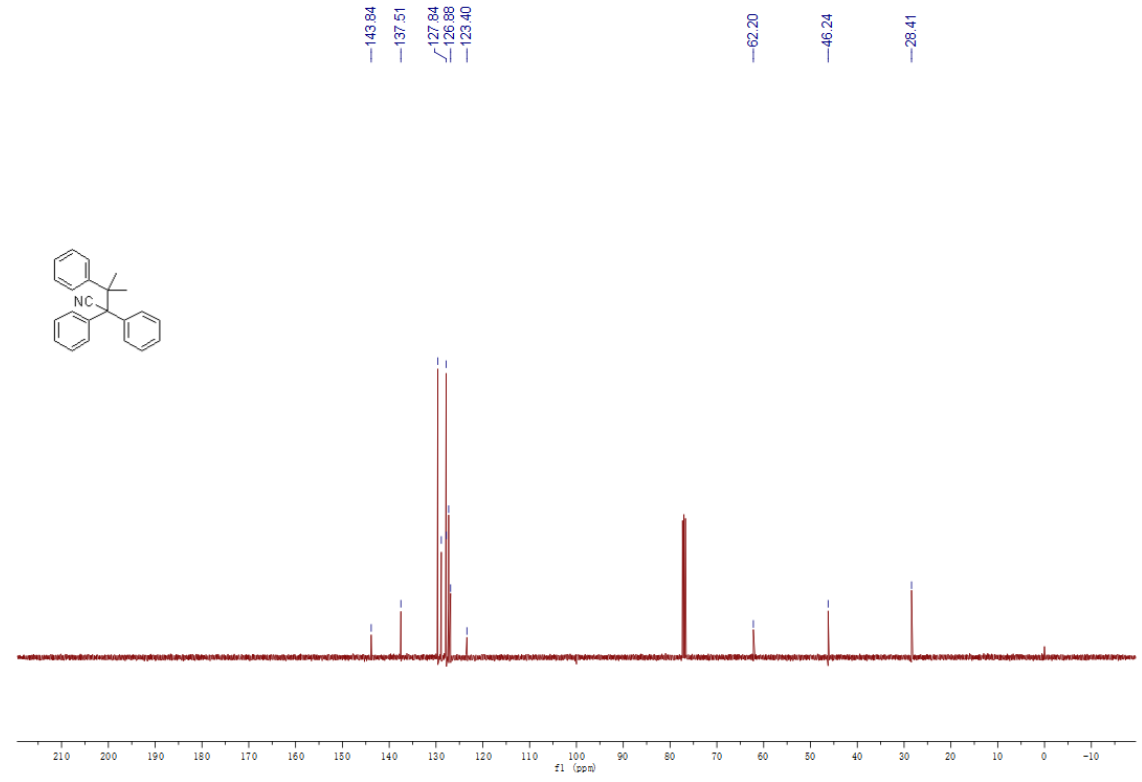

**$^{13}$C NMR spectrum of 6-chloro-3-(2-(3-chlorophenyl)propan-2-yl)-3-(3-methoxyphenyl)indolin-2-one (72):**



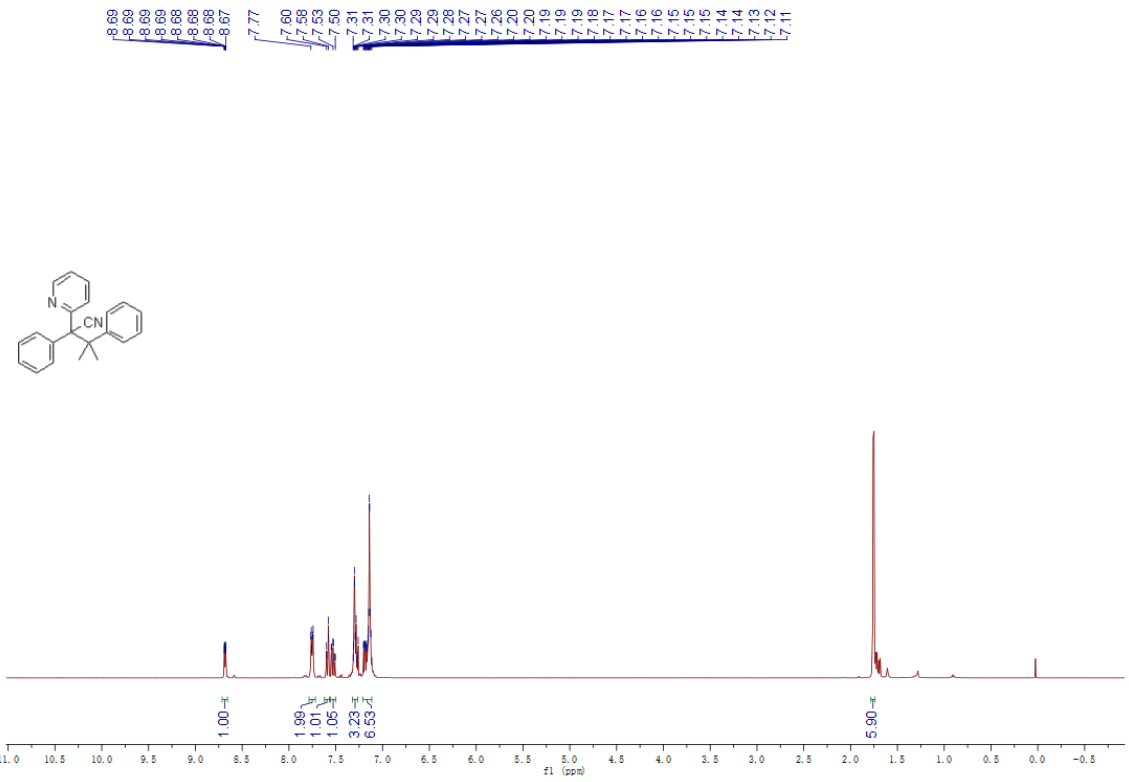
**$^{1}$H NMR spectrum of 3-methyl-2,2,3-triphenylbutanenitrile (73):**



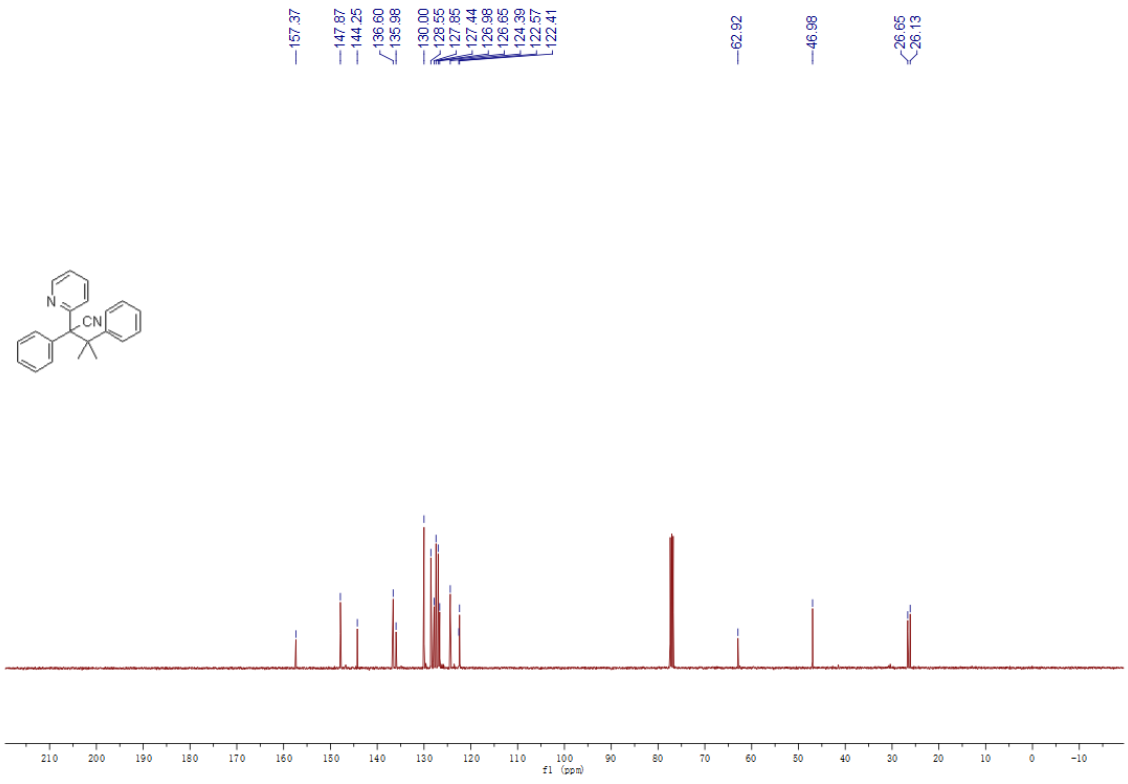

**$^{13}$C NMR spectrum of 3-methyl-2,2,3-triphenylbutanenitrile (73):**



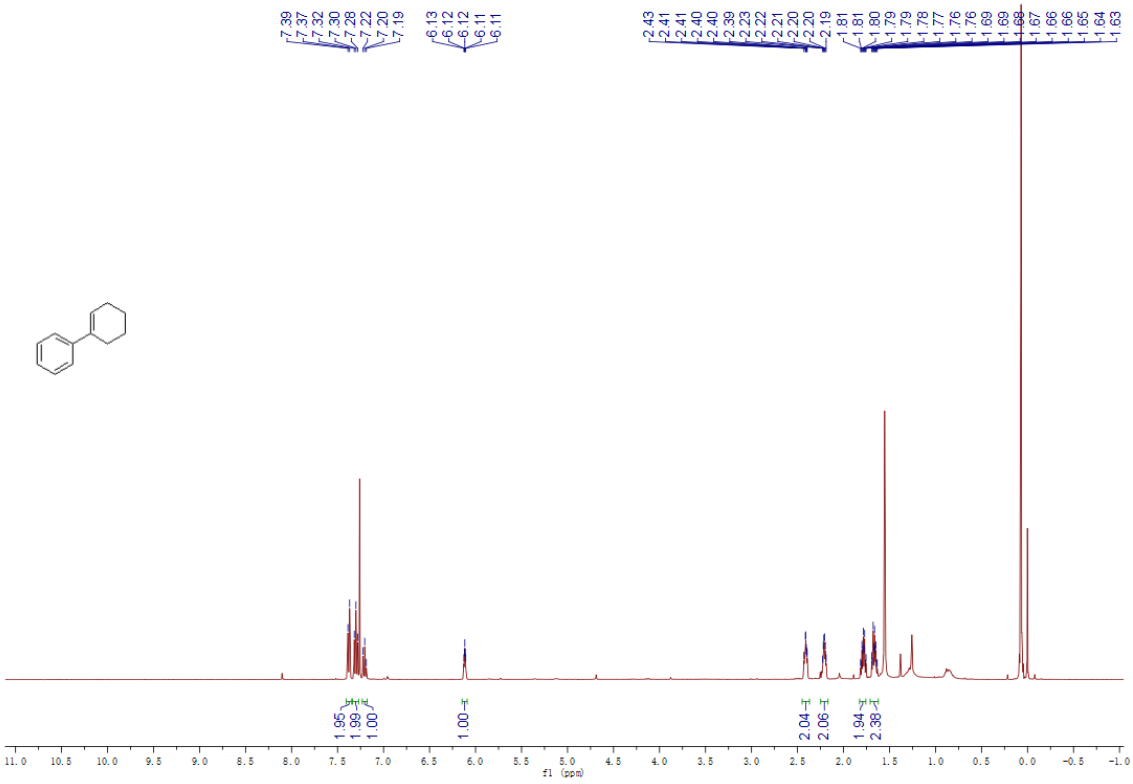
**$^{1}$H NMR spectrum of 3-methyl-2,3-diphenyl-2-(pyridin-2-yl)butanenitrile (74):**



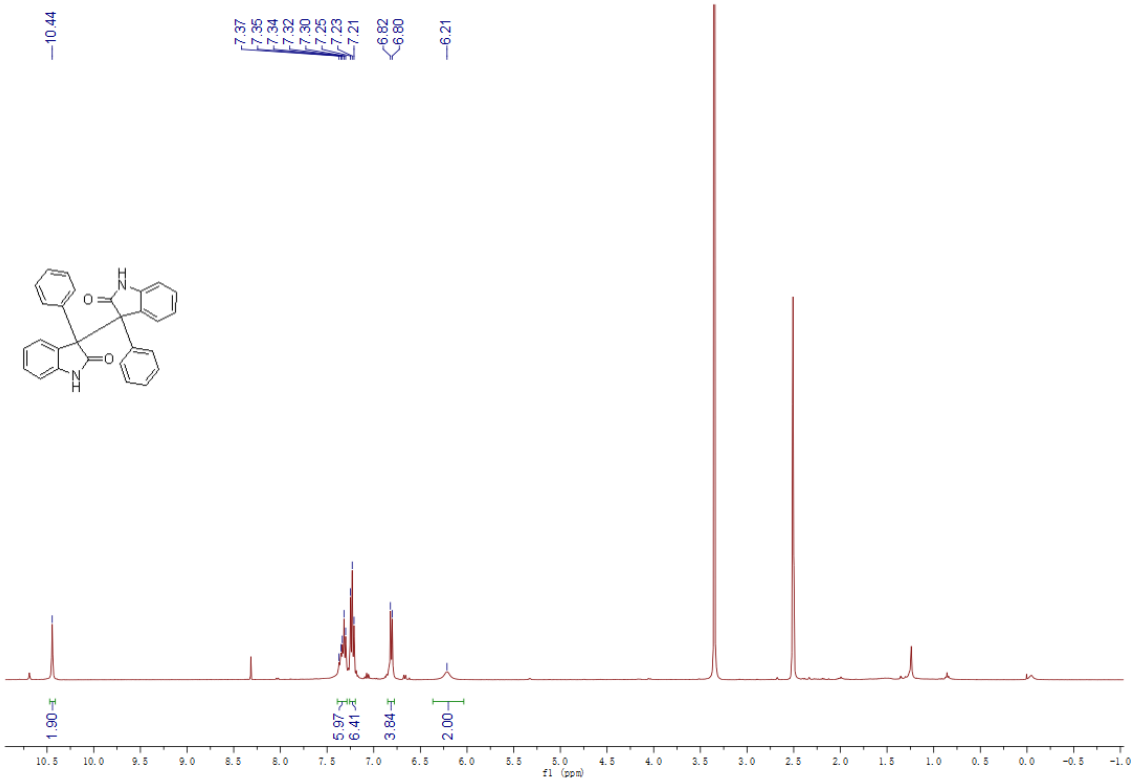

**$^{13}$C NMR spectrum of 3-methyl-2,3-diphenyl-2-(pyridin-2-yl)butanenitrile (74):**



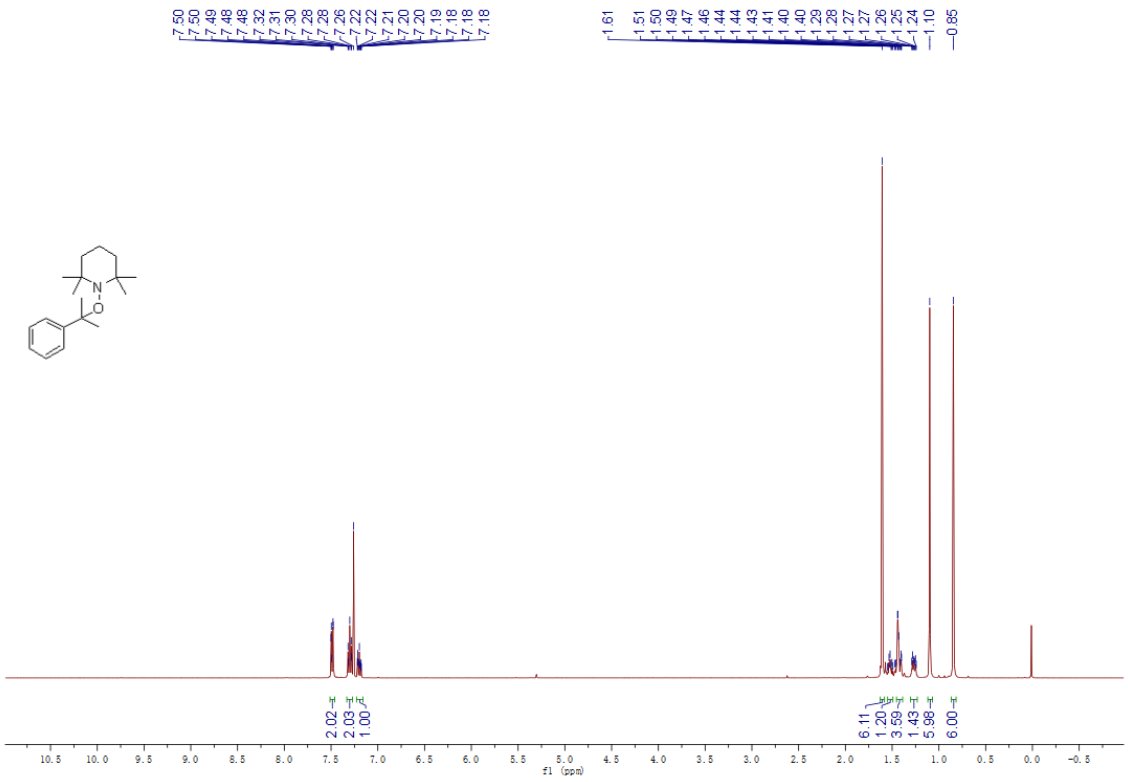
**$^{1}$H NMR spectrum of 2,3,4,5-tetrahydro-1,1'-biphenyl (76):**



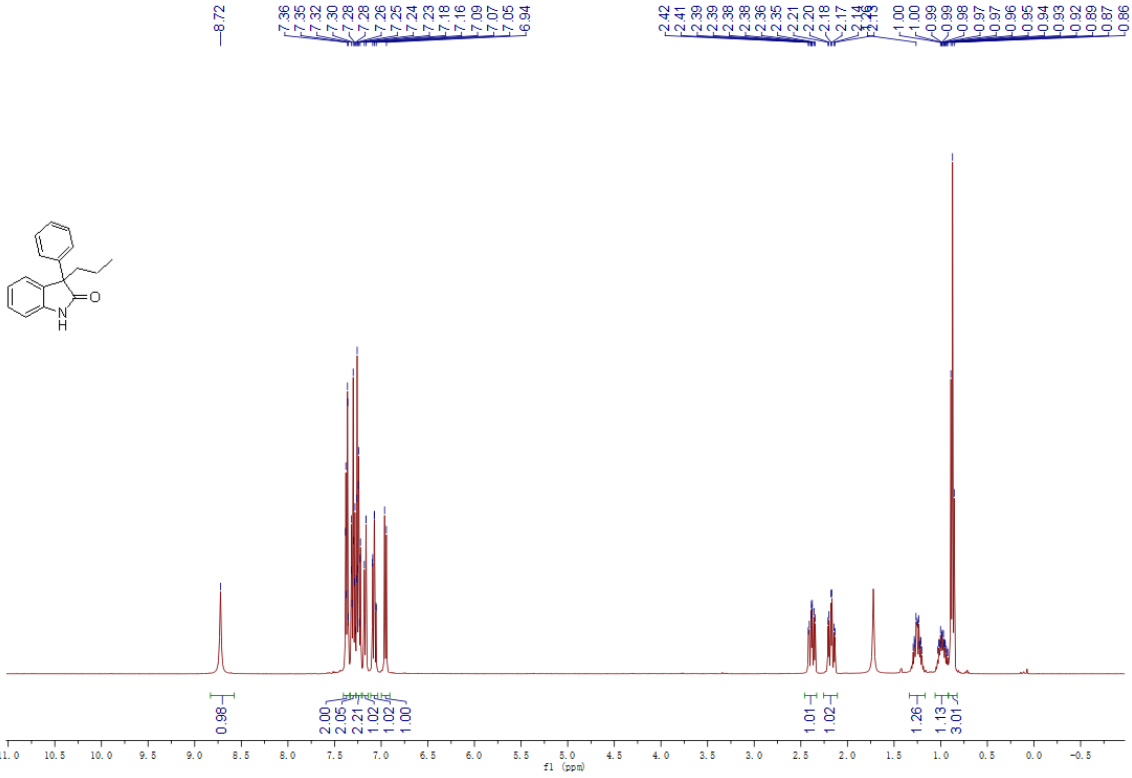
**$^{1}$H NMR spectrum of 3,3'-diphenyl-[3,3'-biindoline]-2,2'-dione (77):**



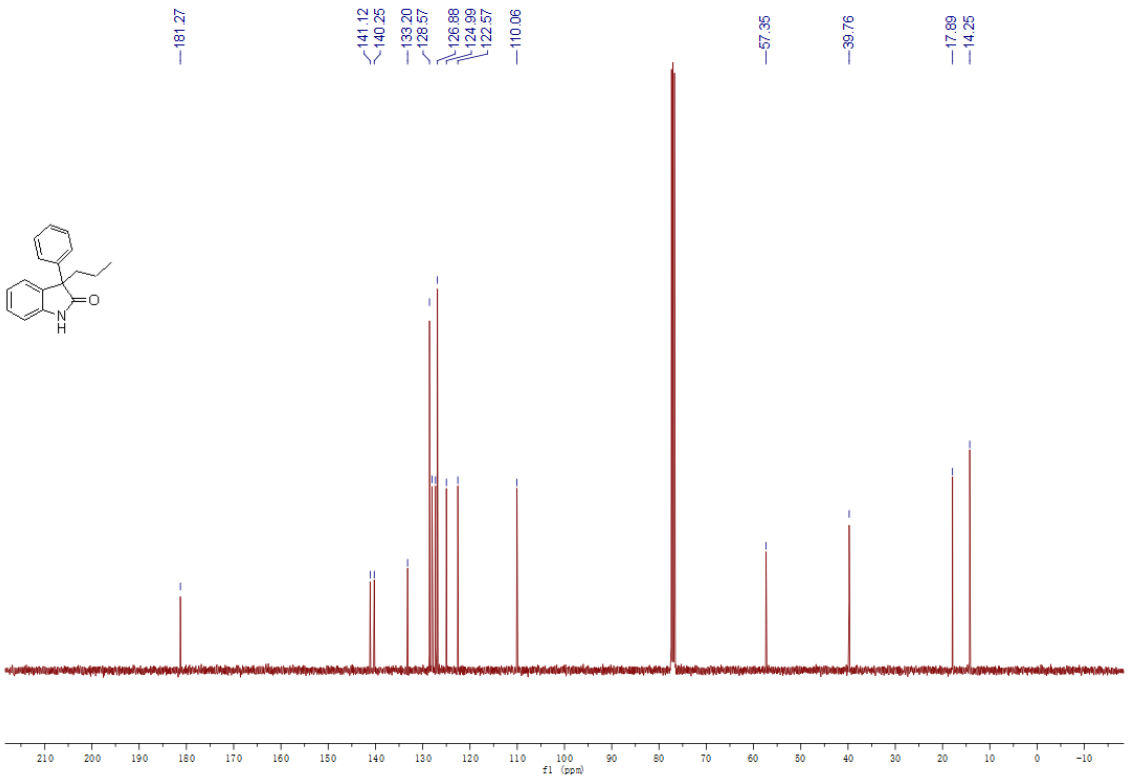
**$^{1}$H NMR spectrum of 2,2,6,6-tetramethyl-1-((2-phenylpropan-2-yl)oxy)piperidine (78):**



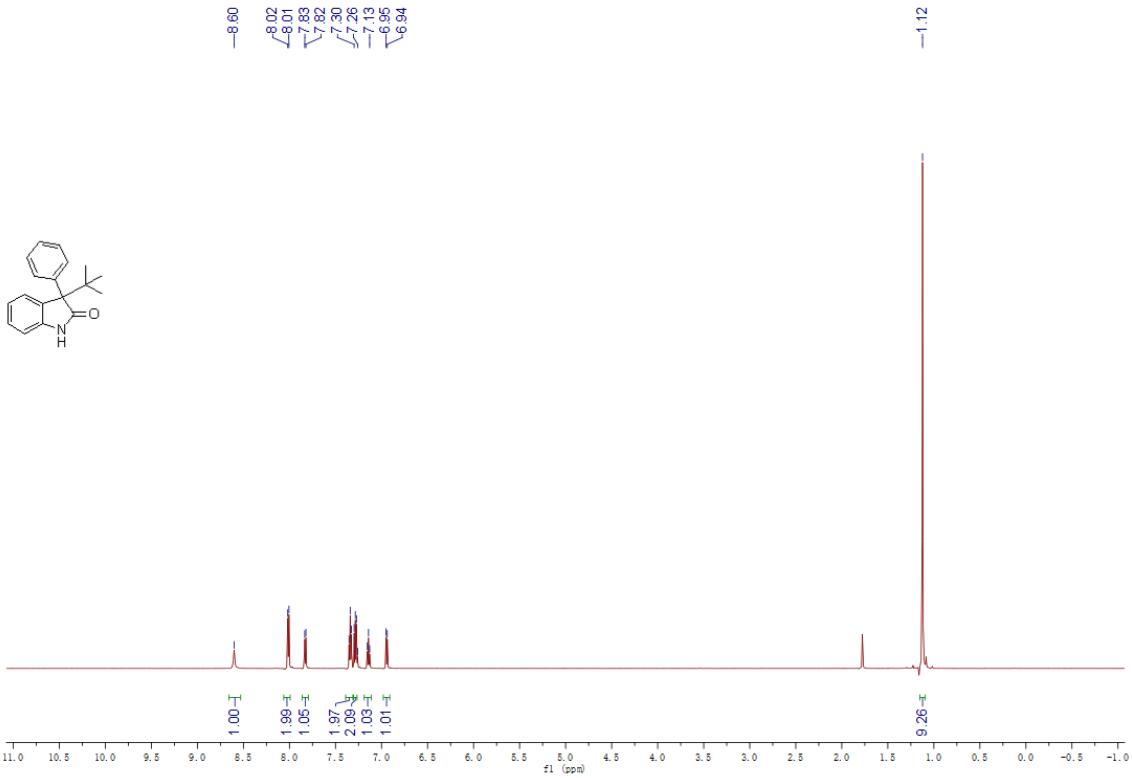
**$^{1}$H NMR spectrum of 3-phenyl-3-propylindolin-2-one. (79)**



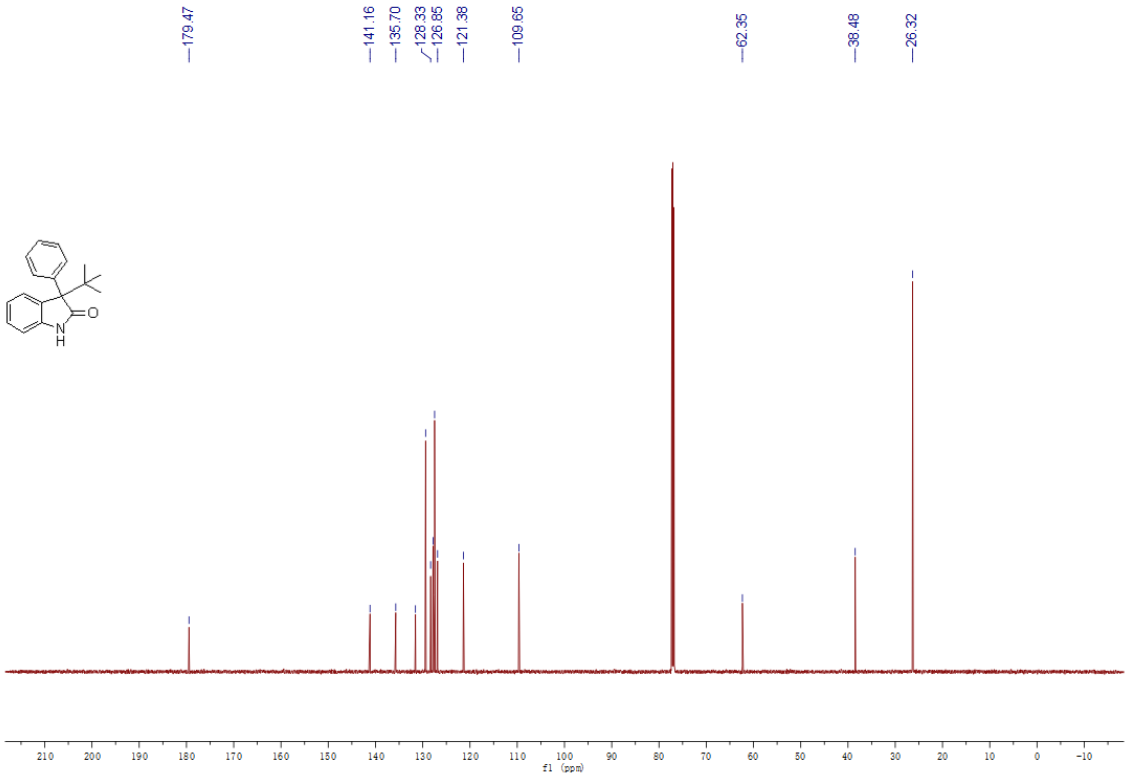

**$^{13}$C NMR spectrum of 3-phenyl-3-propylindolin-2-one. (79)**



**$^{1}$H NMR spectrum of 3-(tert-butyl)-3-phenylindolin-2-one. (80)**




**$^{13}$C NMR spectrum of 3-(tert-butyl)-3-phenylindolin-2-one. (80)**



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