Supplementary Information

Facile cyclization in the synthesis of highly fused diaza cyclooctanoid compounds using retrievable nano magnetite-supported sulfonic acid catalyst

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Preparation of Fe_3O_4 nano particle: $FeCl_3 \cdot 6H_2O$ (8.1 g) and urea (5.4 g) were stirred in 300 mL double distilled water at 85 to 90 °C for 2 h. The resultant brown colored reaction mixture was cooled to room temperature and $FeSO_4 \cdot 7H_2O$ (4.2 g) was added into it. The pH of the resultant solution was maintained at 10 by addition of the 0.1 M NaOH. The molar ratio of Fe(III) to Fe(II) in the above system was nearly 2.00. The obtained hydroxides were kept under ultrasonication in the sealed flask at room temperature for 30 min. After ageing for 5 h, the

obtained black powder (Fe_3O_4) was washed several times with distilled water, and dried under vacuum.

Preparation of Fe_3O_4-OSO_3H catalyst: In a two neck round bottom flask, one neck was equipped with a dropping funnel and other neck is fixed with water vacuum to suck HCl gas generated during the reaction progress. Magnetite (Fe_3O_4) (3 g) was then poured into round bottom flask and neat chlorosulfonic acid was added (1.0 mL) drop by drop over a period of 10 min at room temperature. HCl gas generated immediately from the reaction flask. After complete addition of chlorosulfonic acid, the mixture was stirred vigorously for 30 min and solid brown magnetic sulfonic acid (Nanocat-Fe-OSO_3H) (3.45 g) was collected.

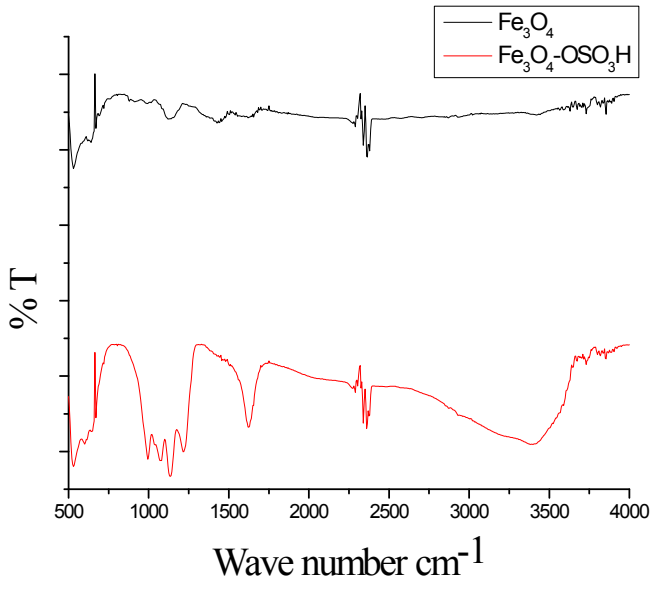
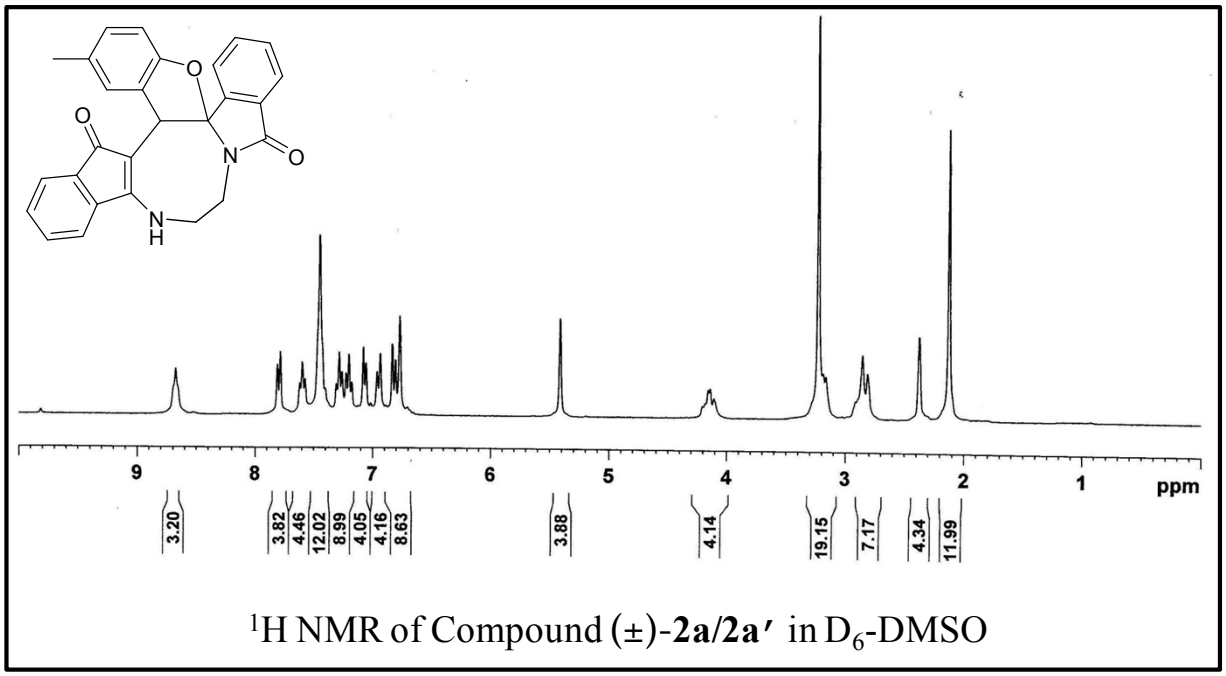
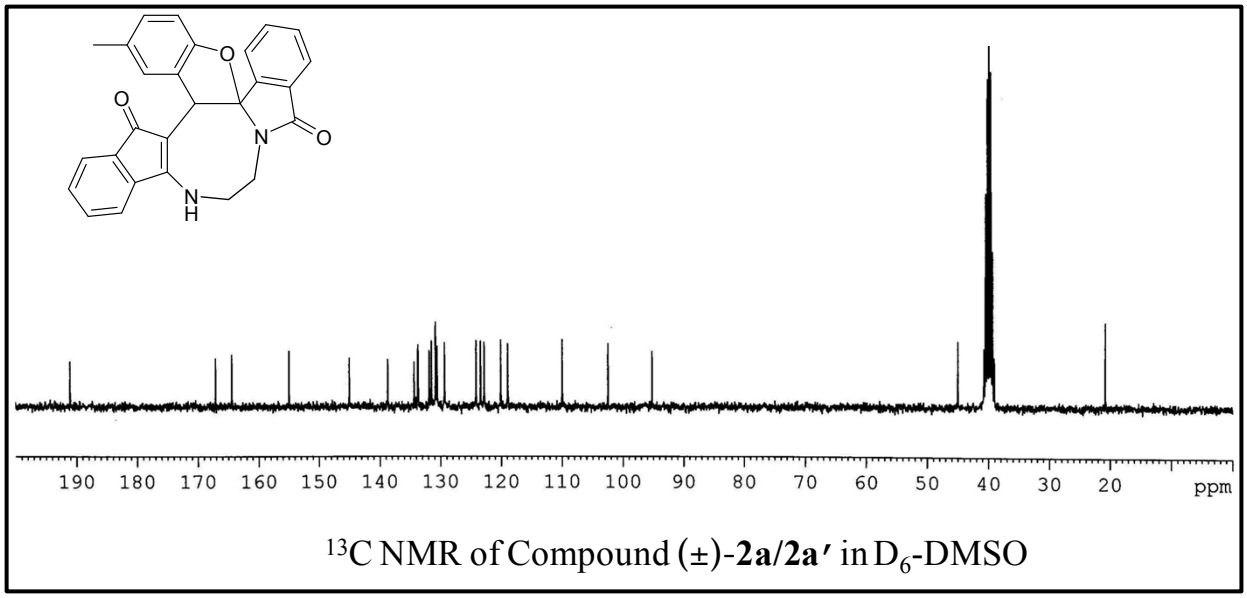


Fig. S1: IR spectrum of Fe_3O_4 and Fe_3O_4-OSO_3H

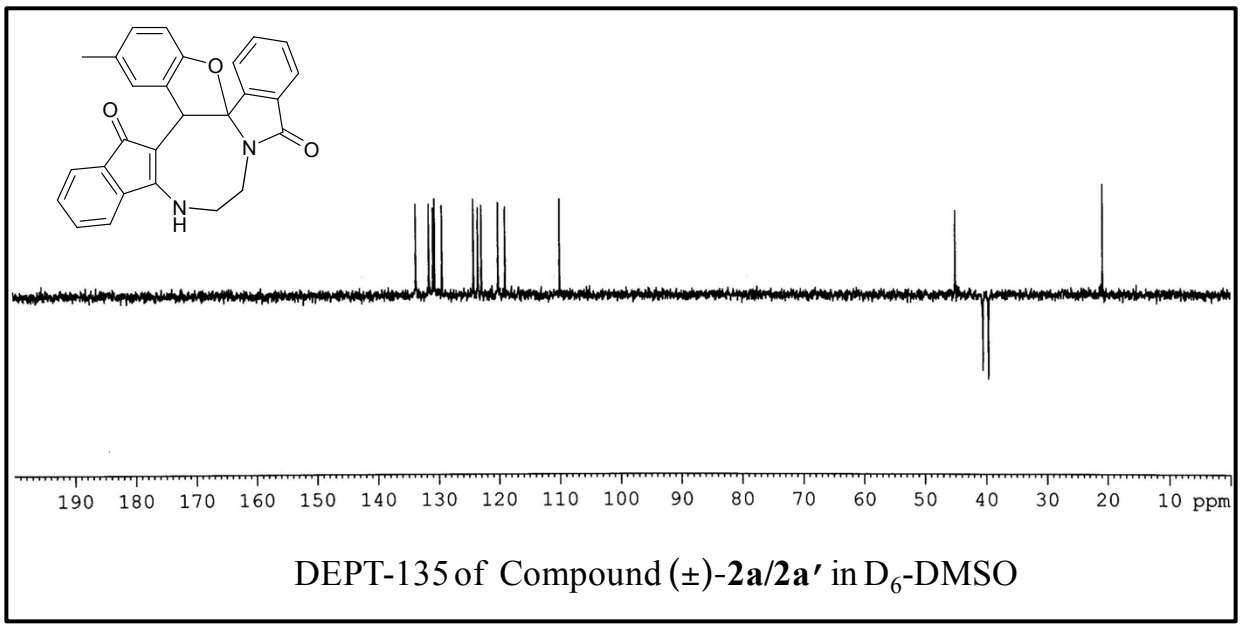
1H NMR and 13C NMR Spectra



^{1}H NMR of Compound (±)-**2a/2a′** in D_6-DMSO



^{13}C NMR of Compound (±)-**2a/2a′** in D_6-DMSO



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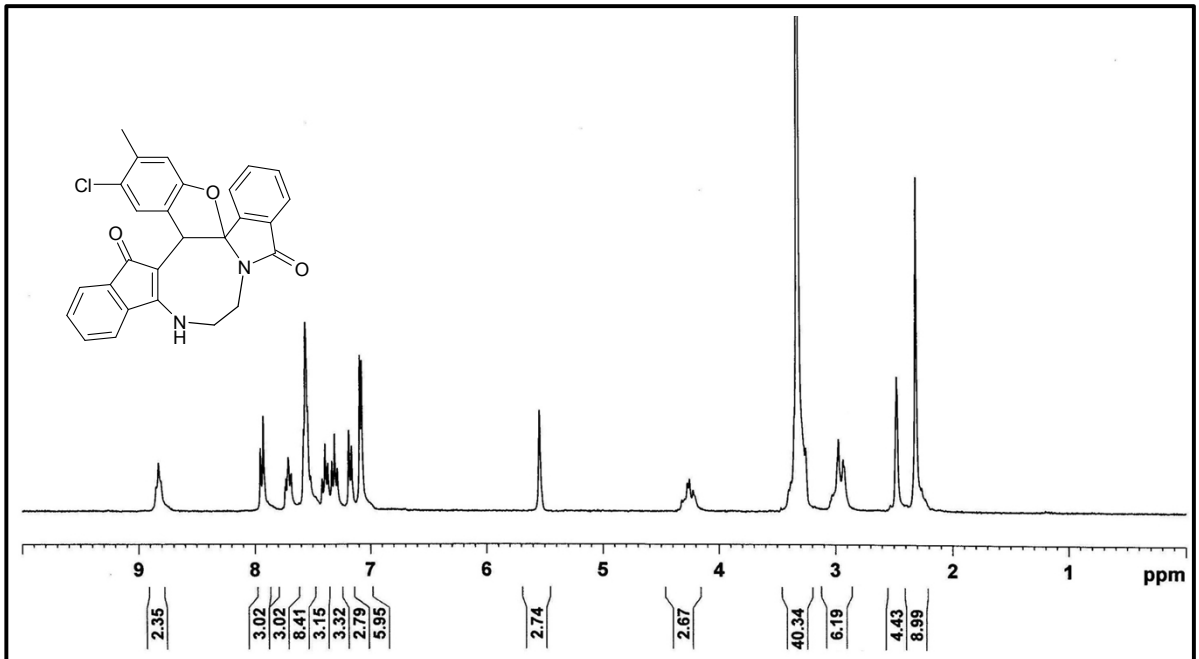
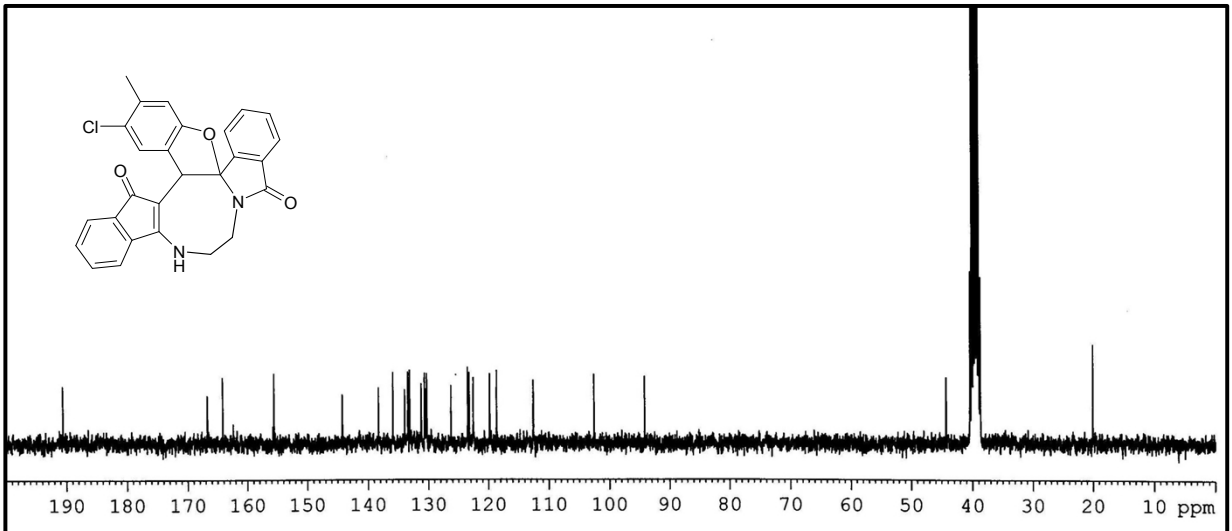


^{1}H NMR of Compound (±)-**2b**/**2b′** in D_6-DMSO



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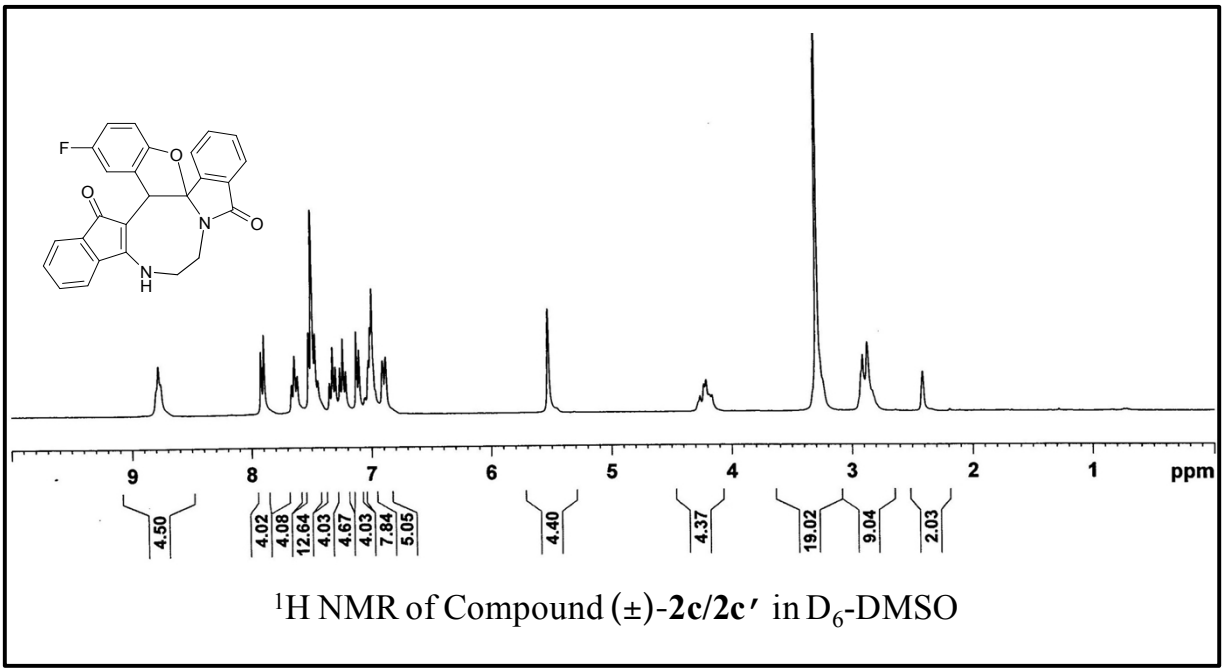

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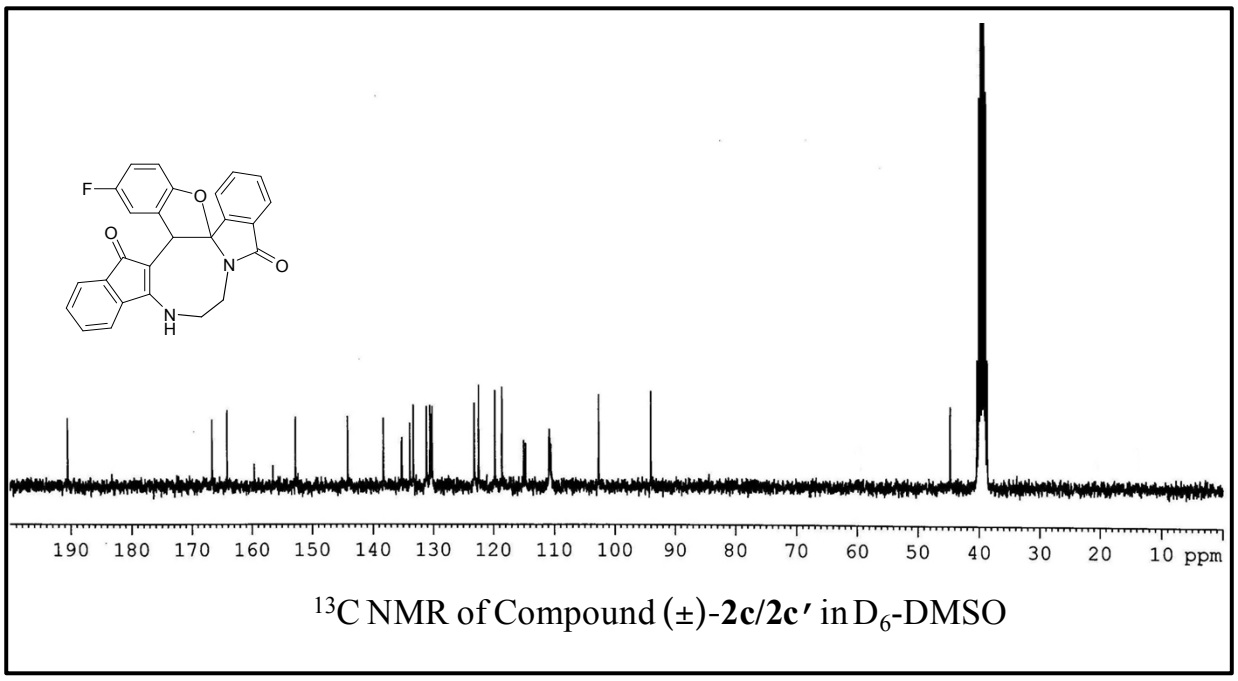

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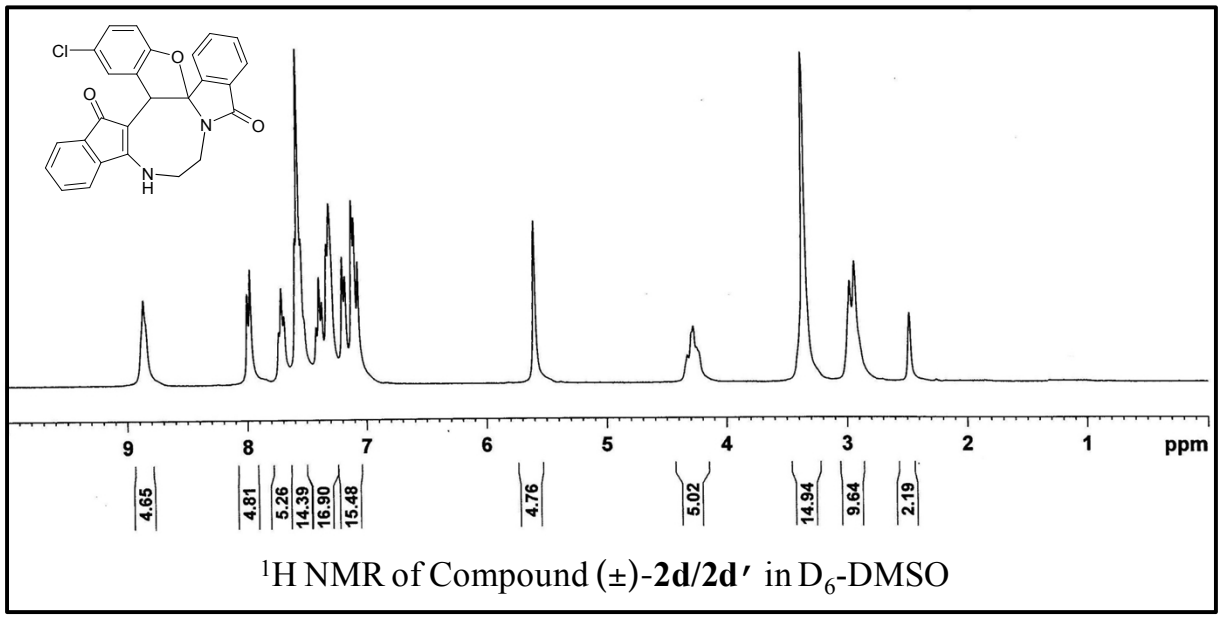

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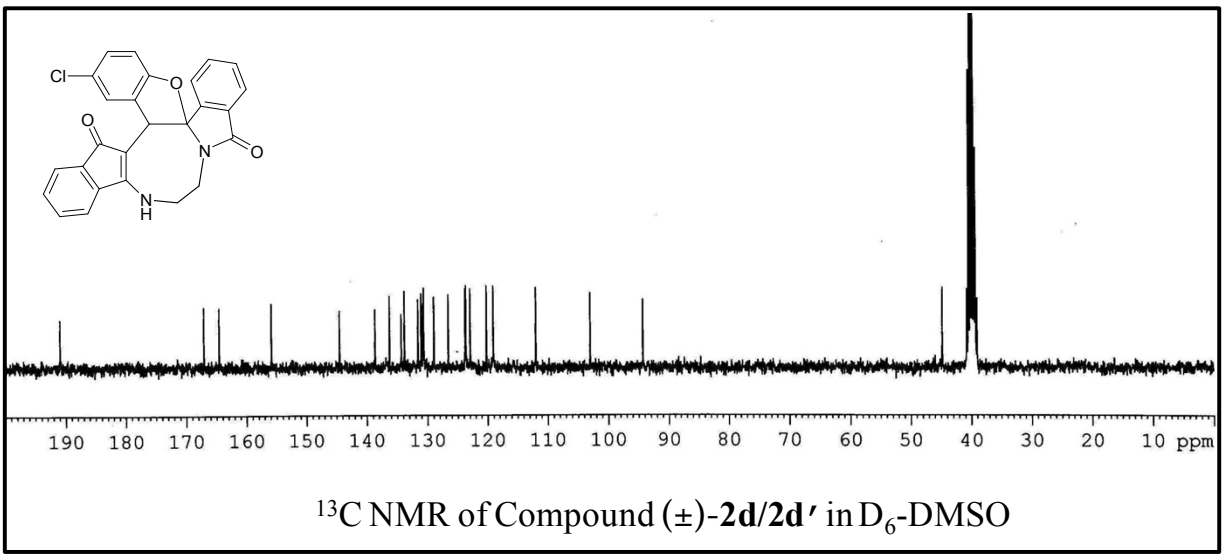

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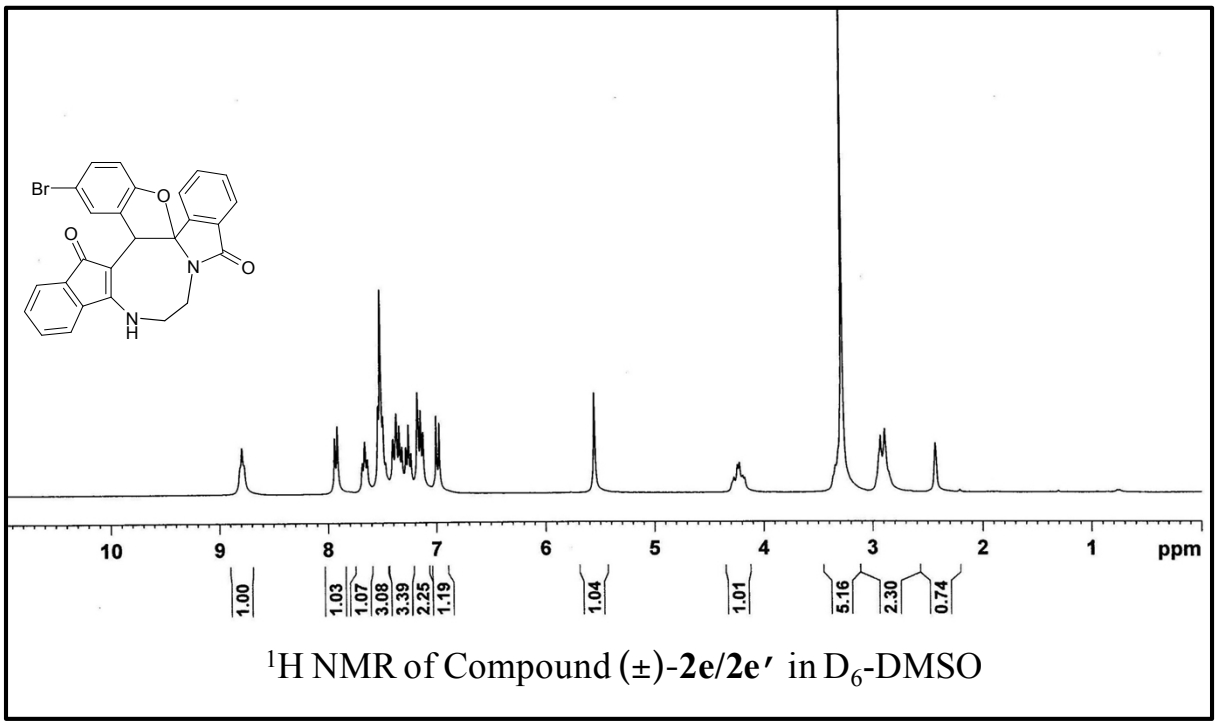

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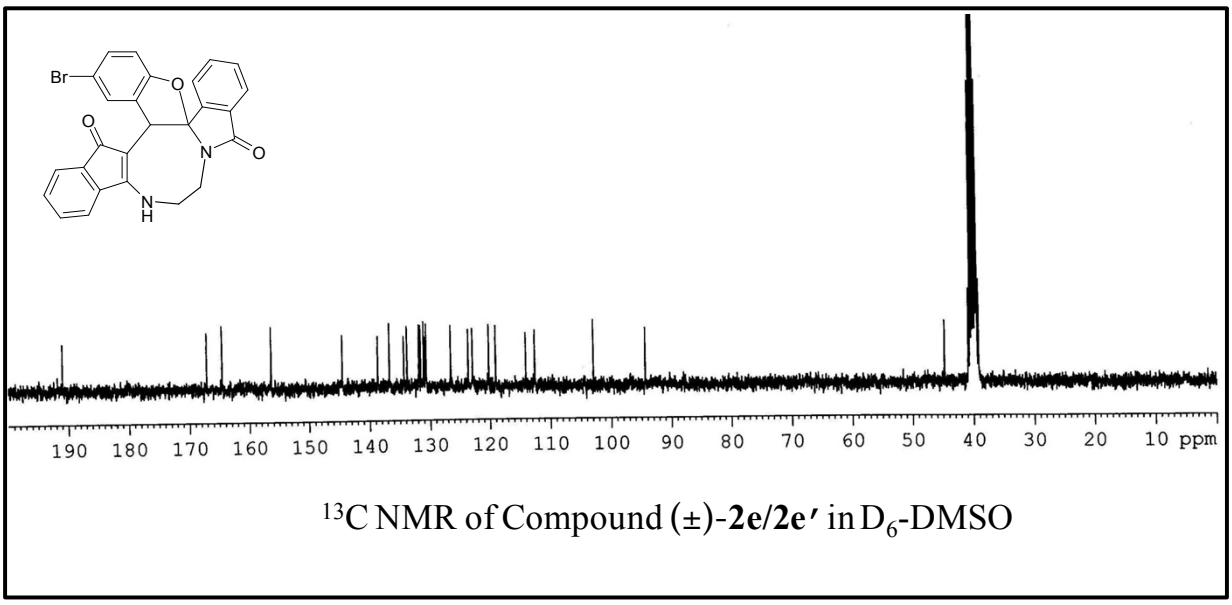

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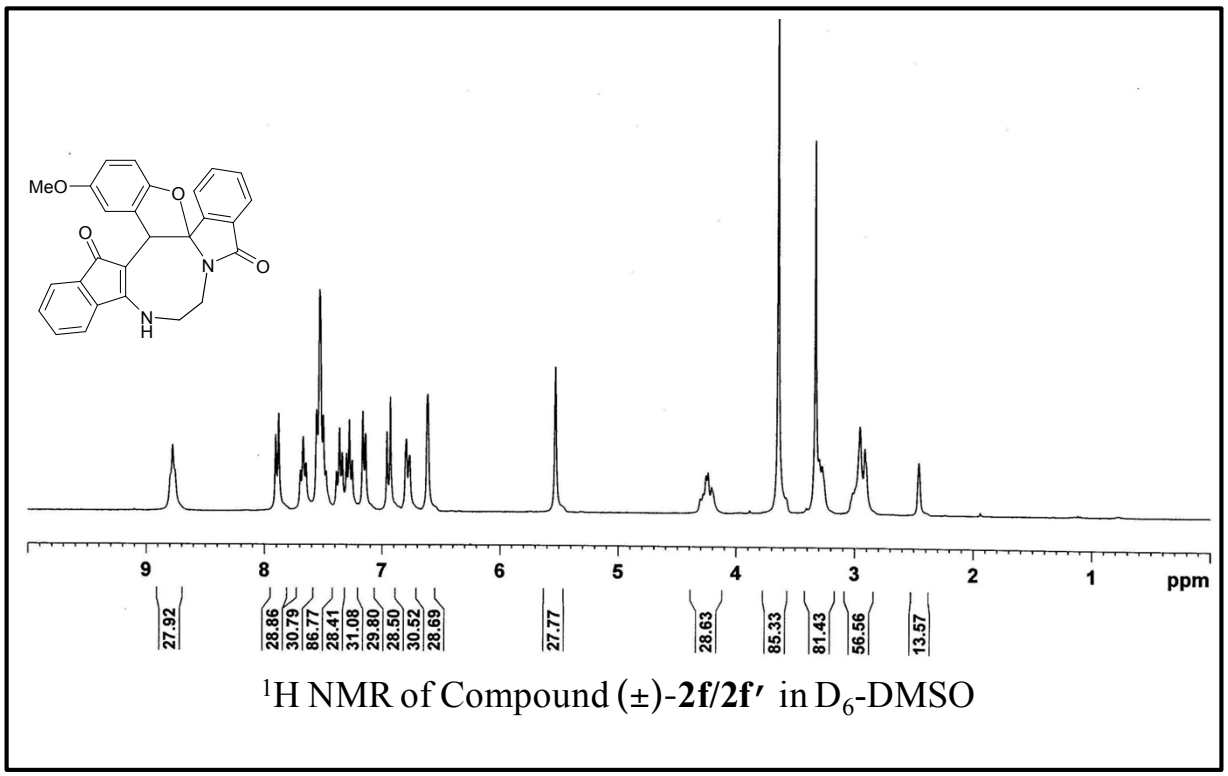

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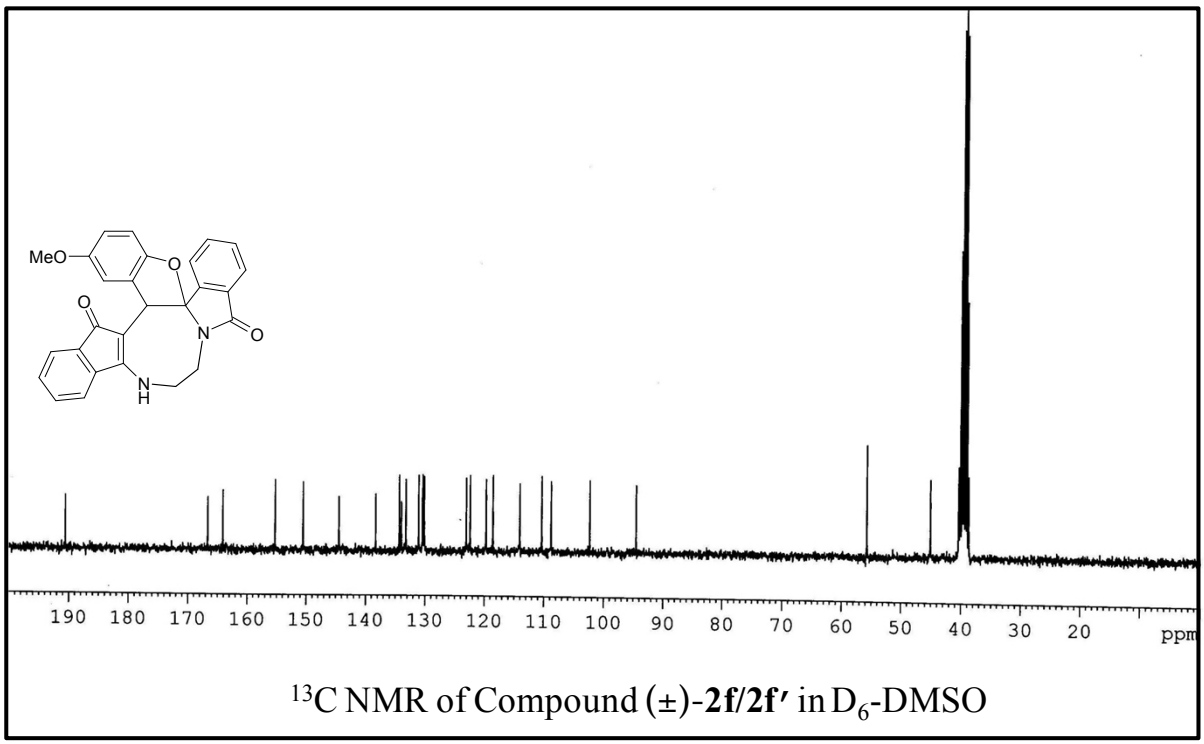

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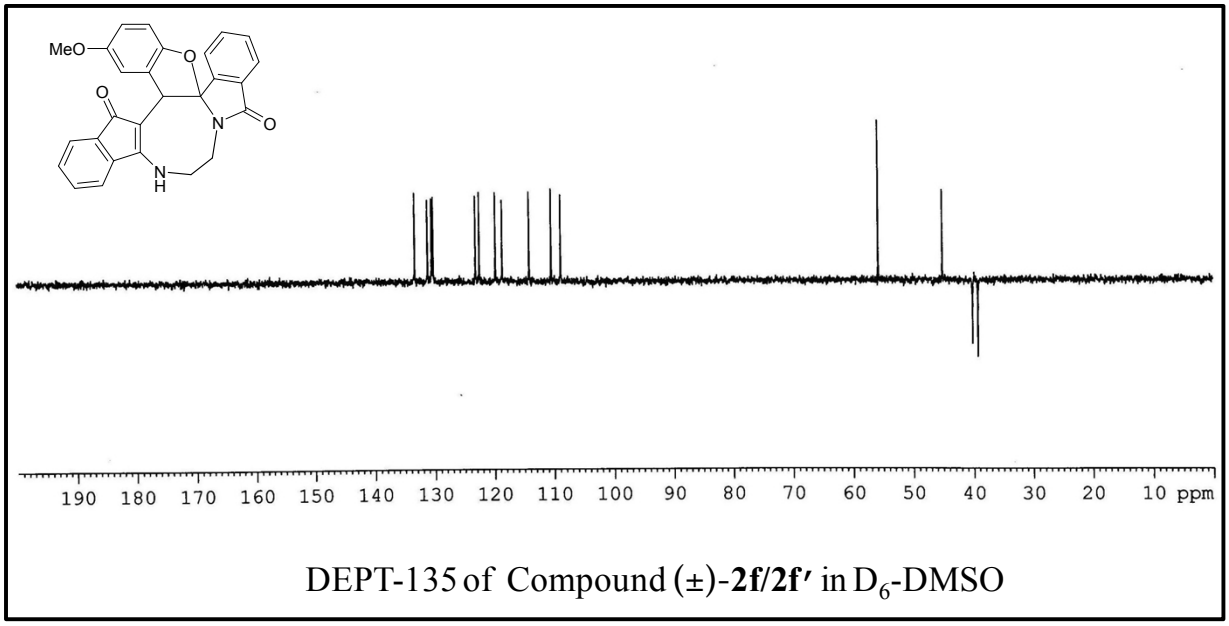

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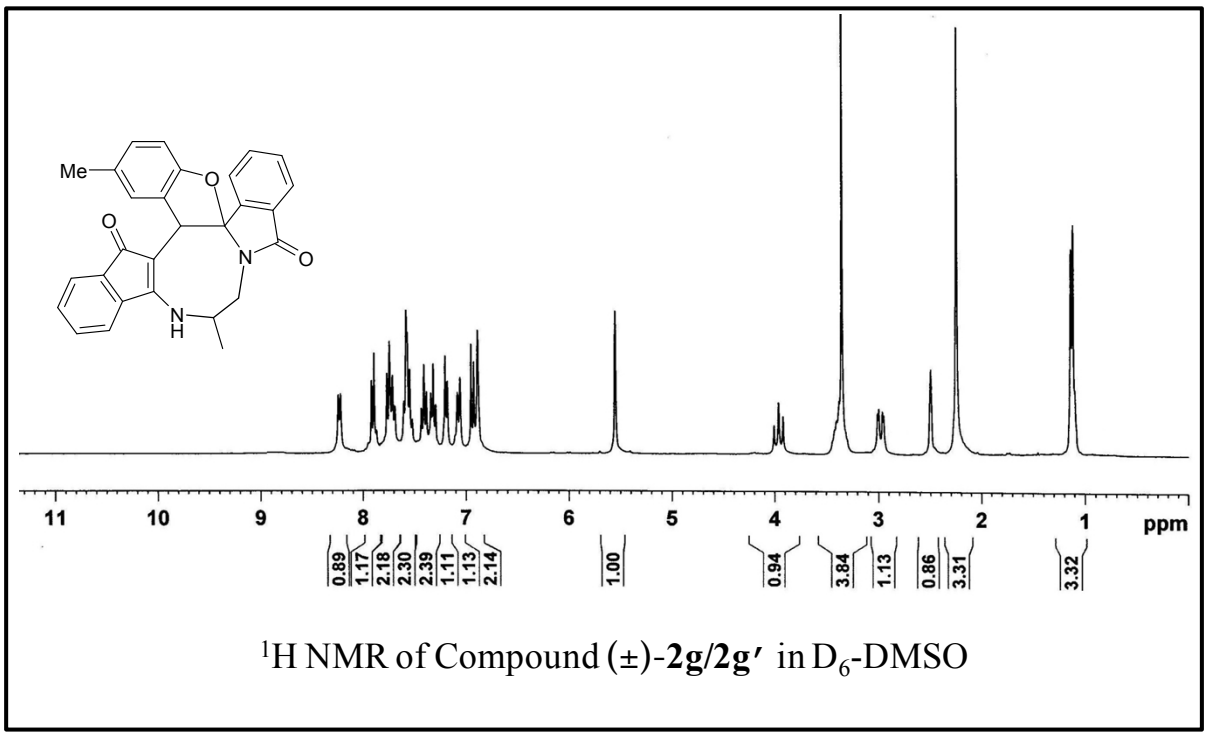

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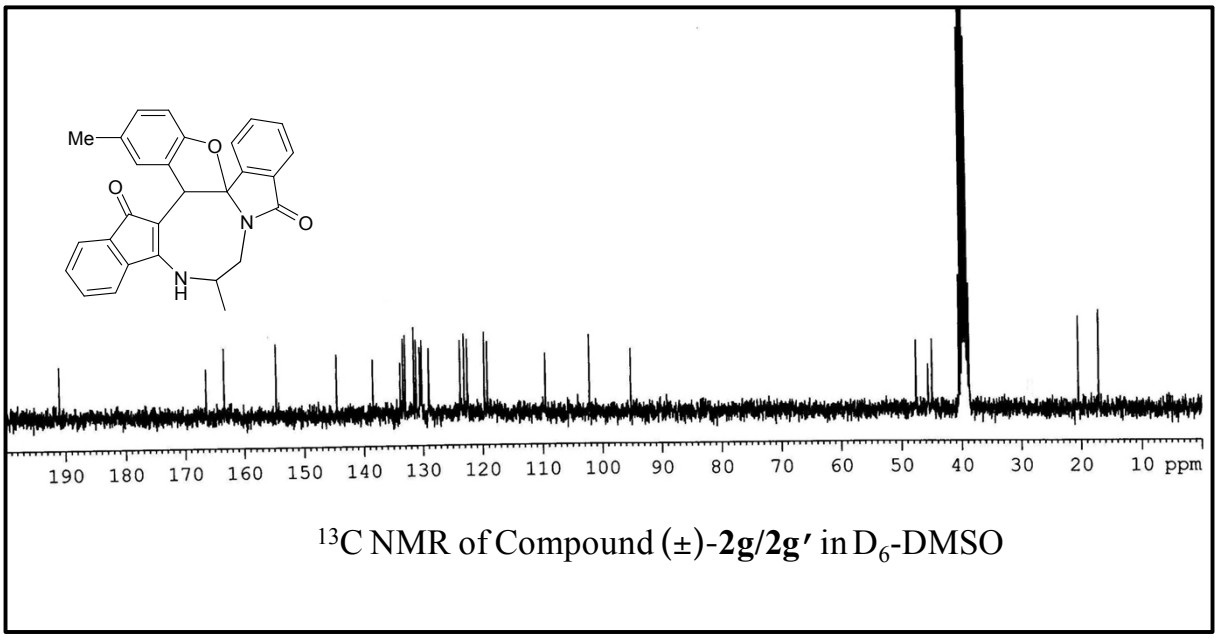

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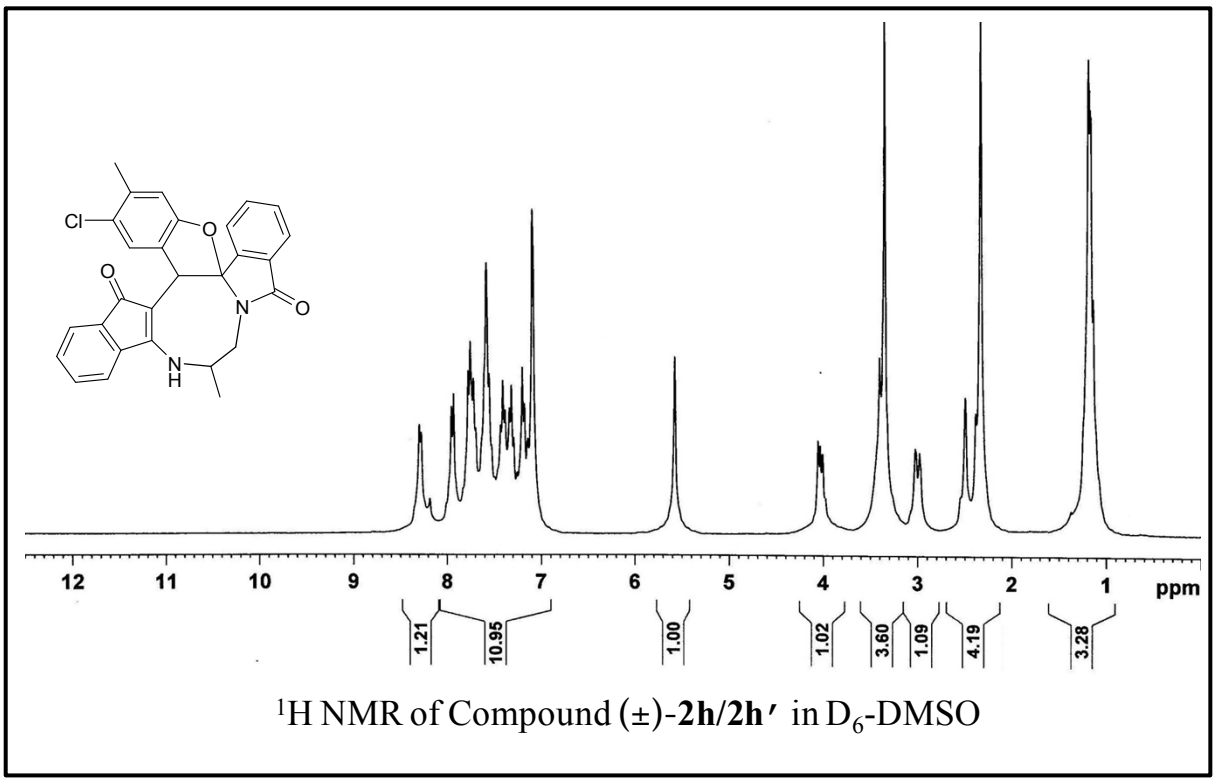

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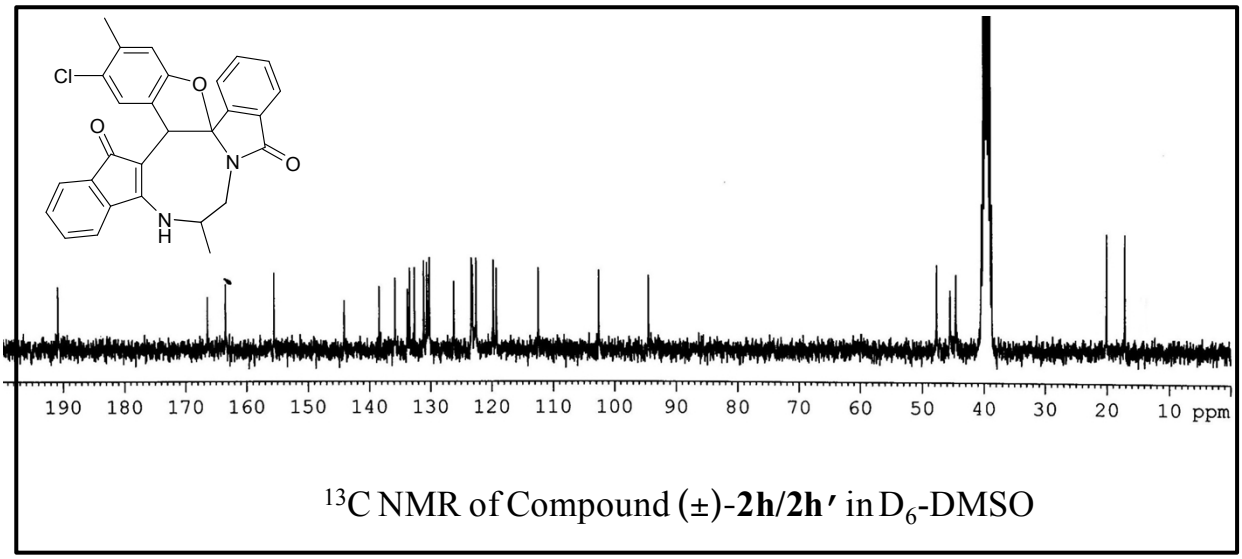

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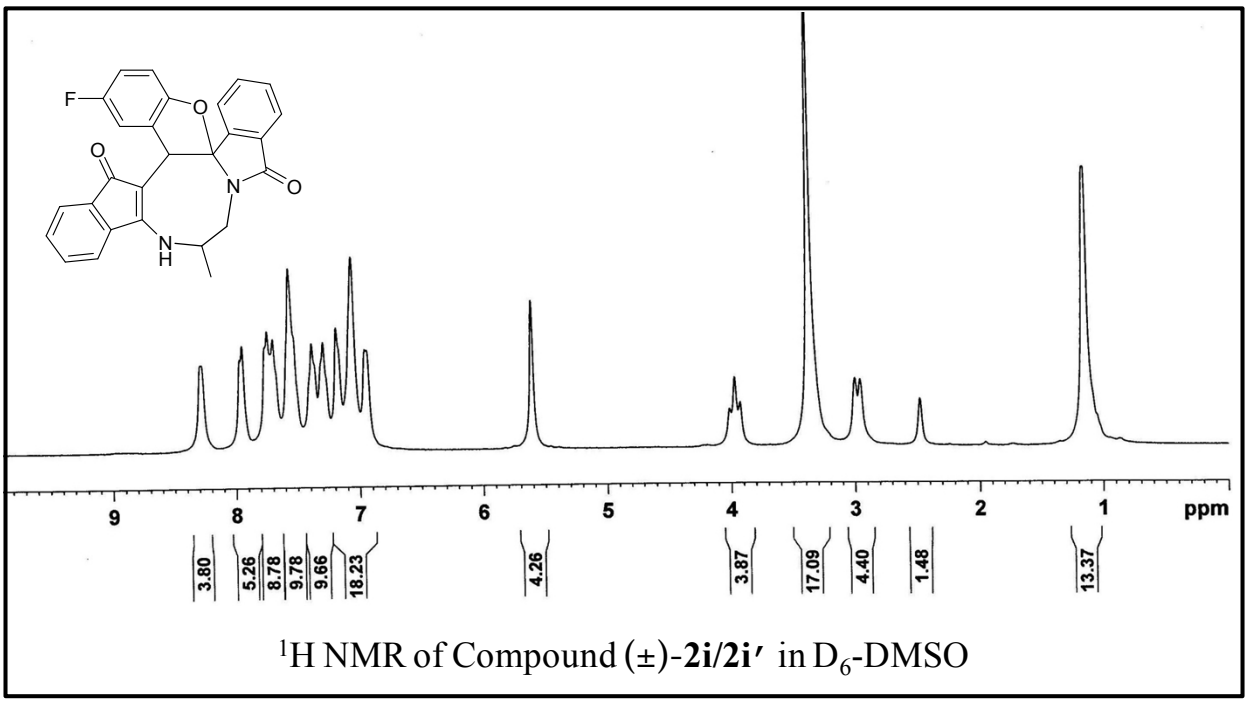

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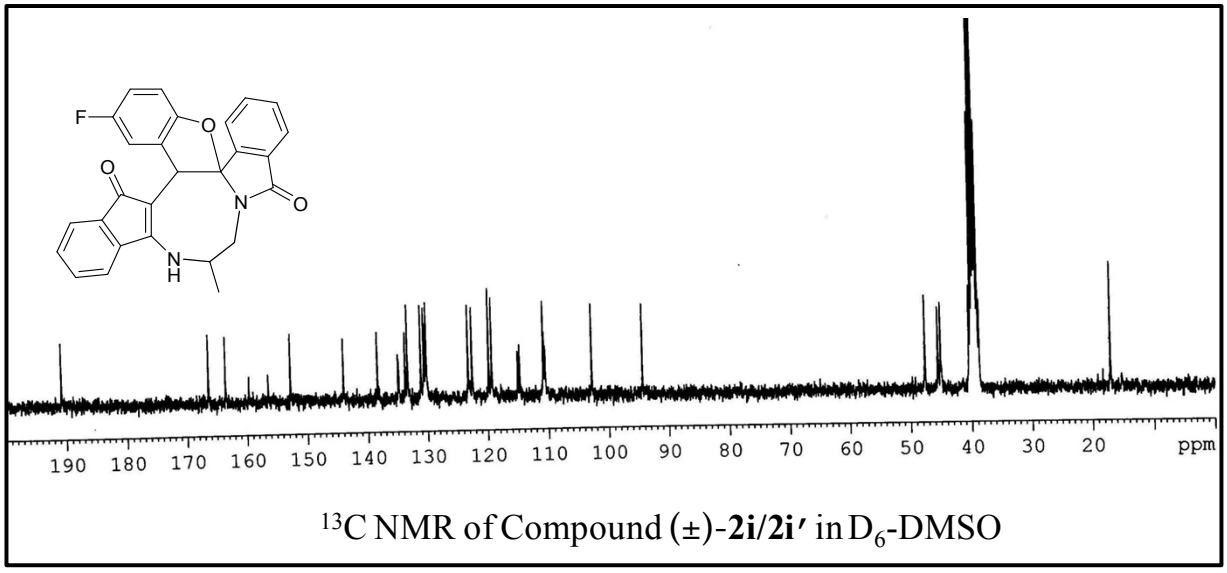

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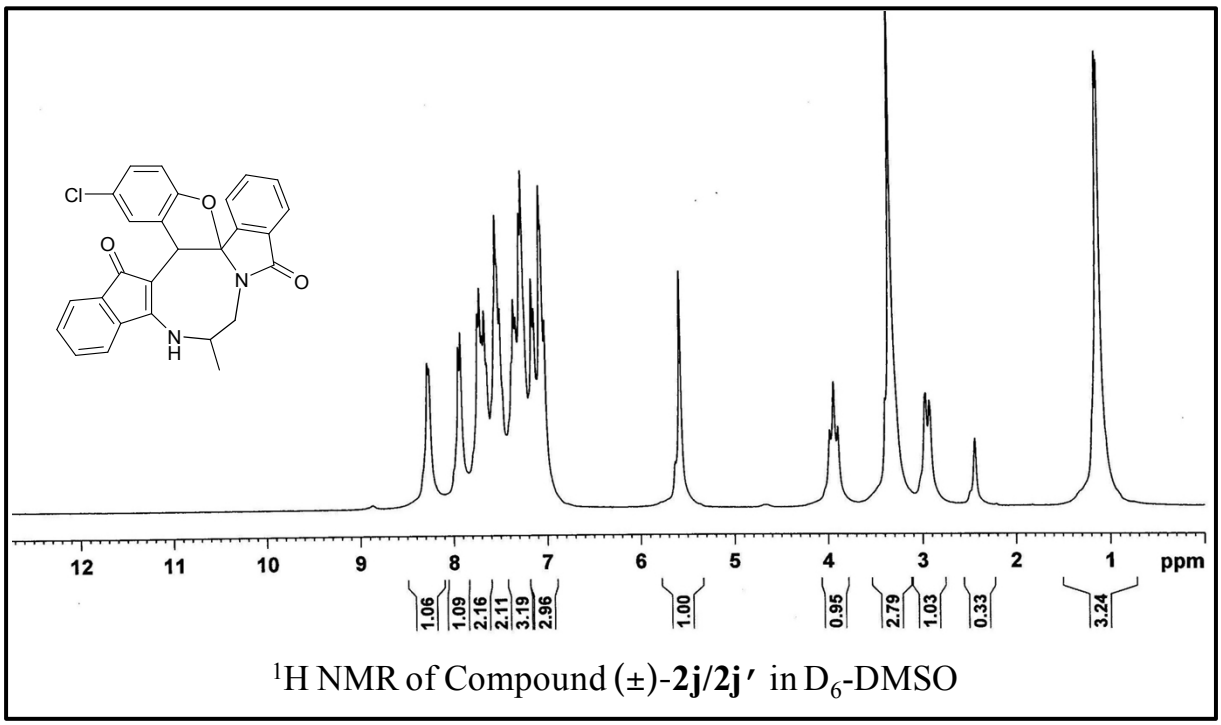

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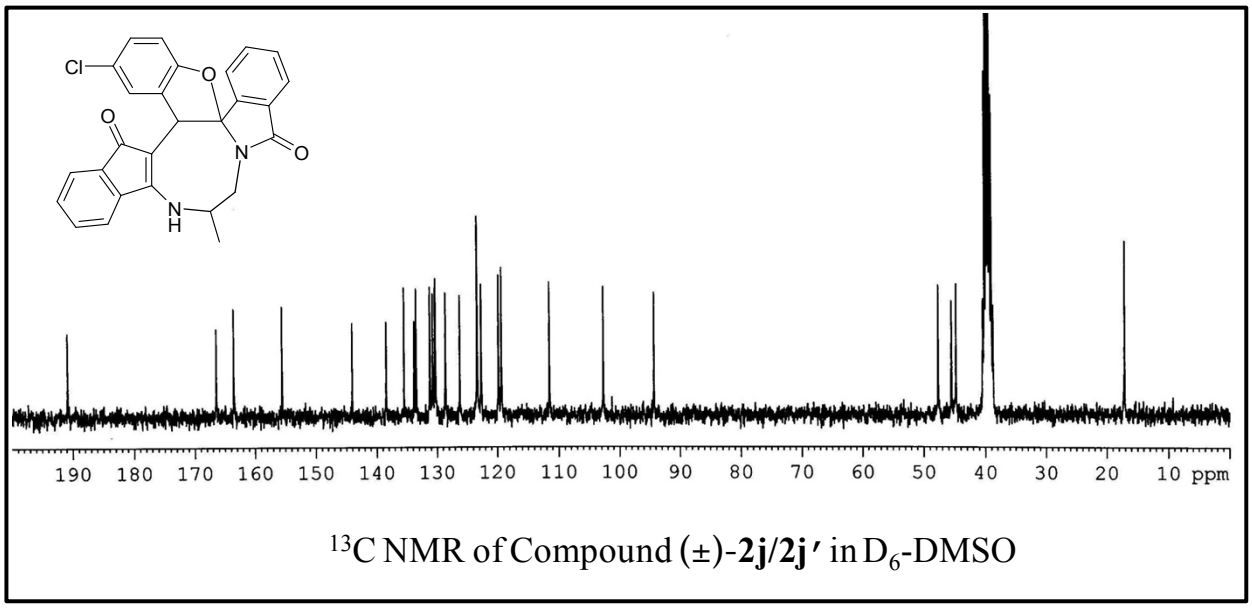

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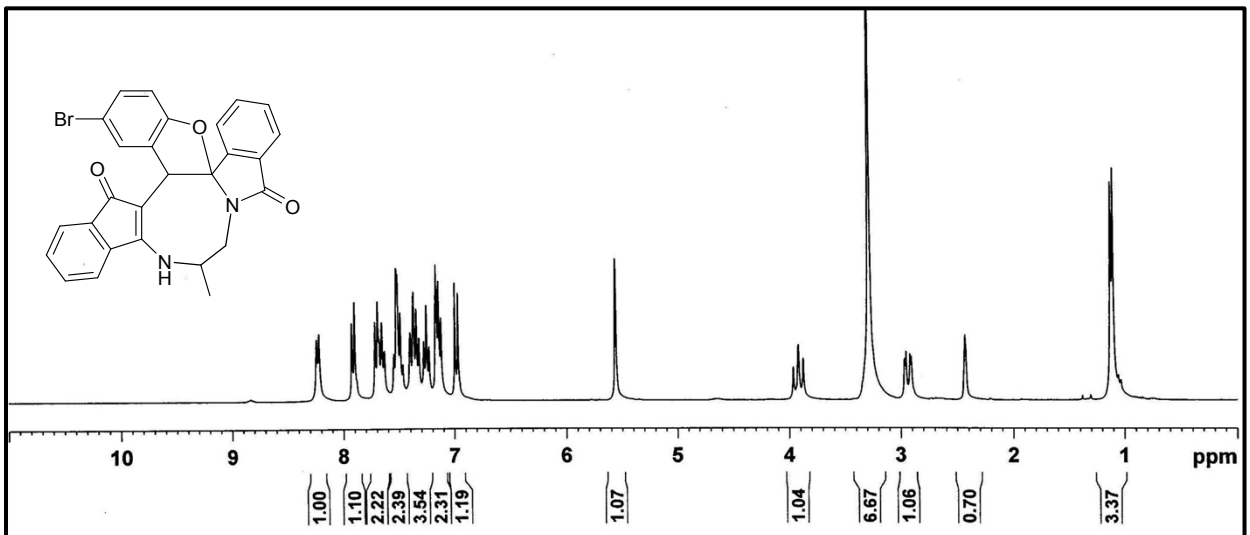

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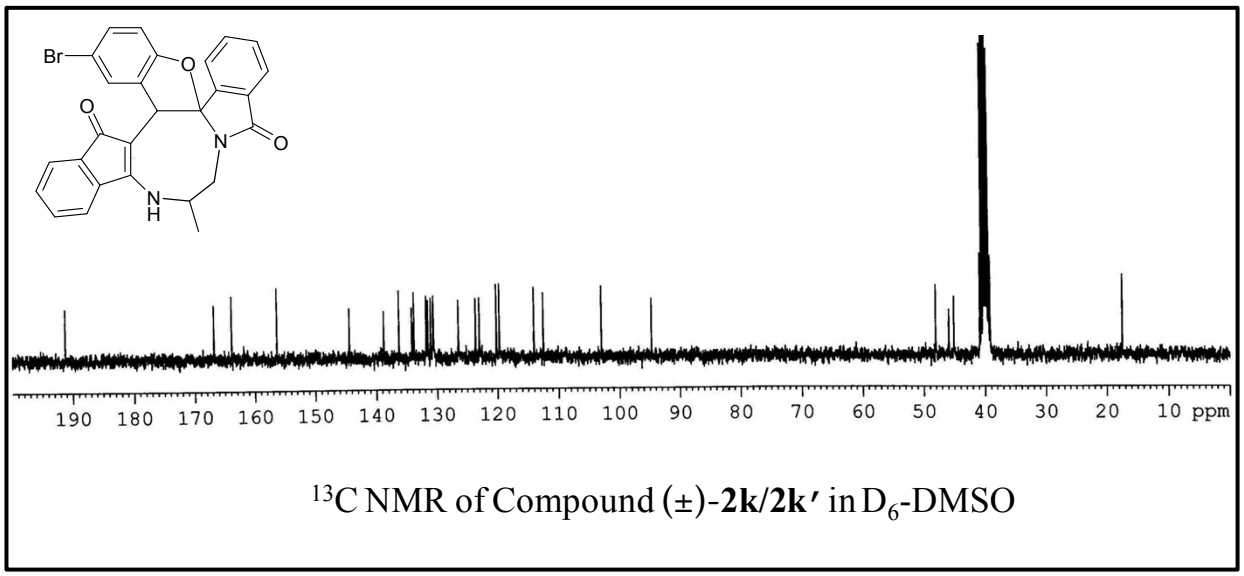

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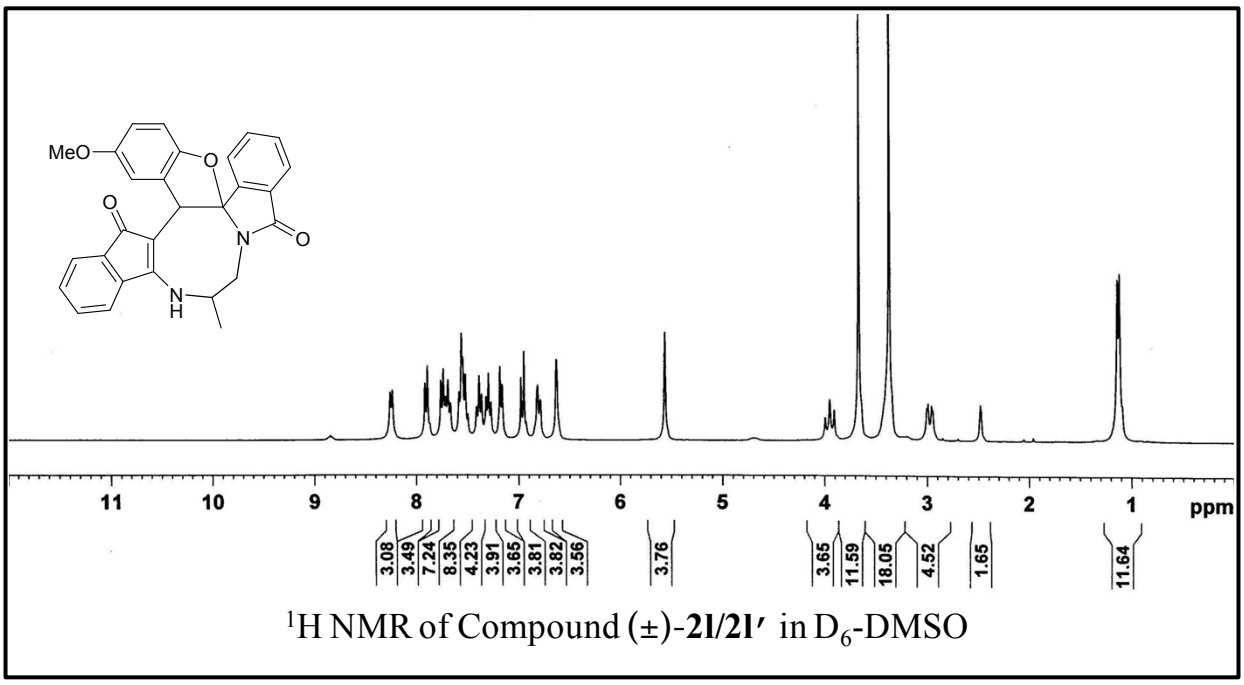

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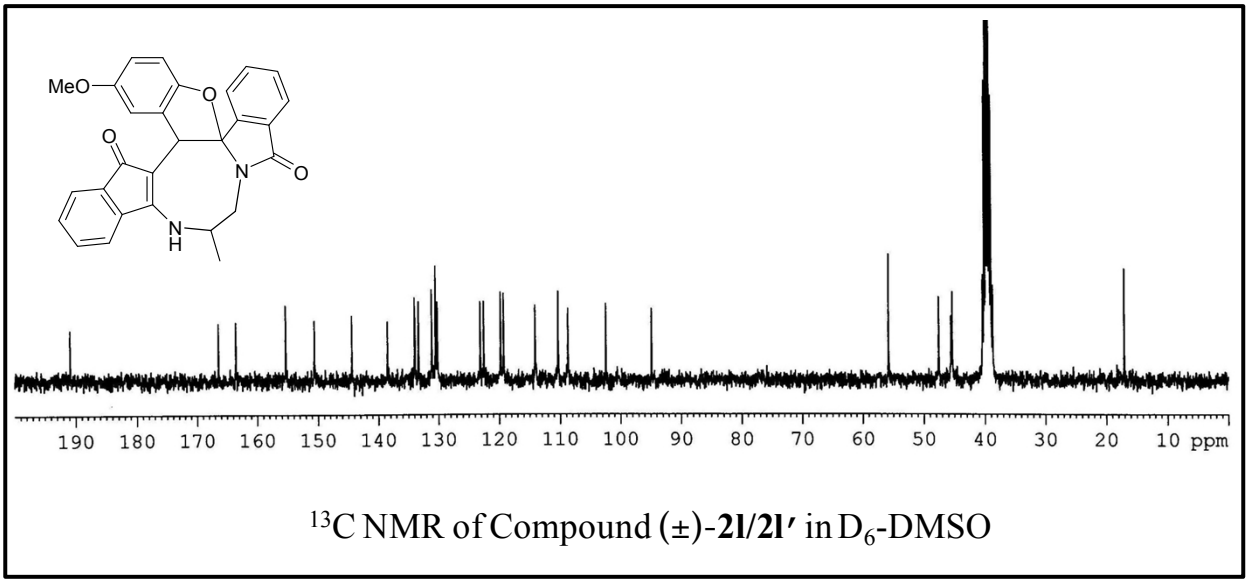

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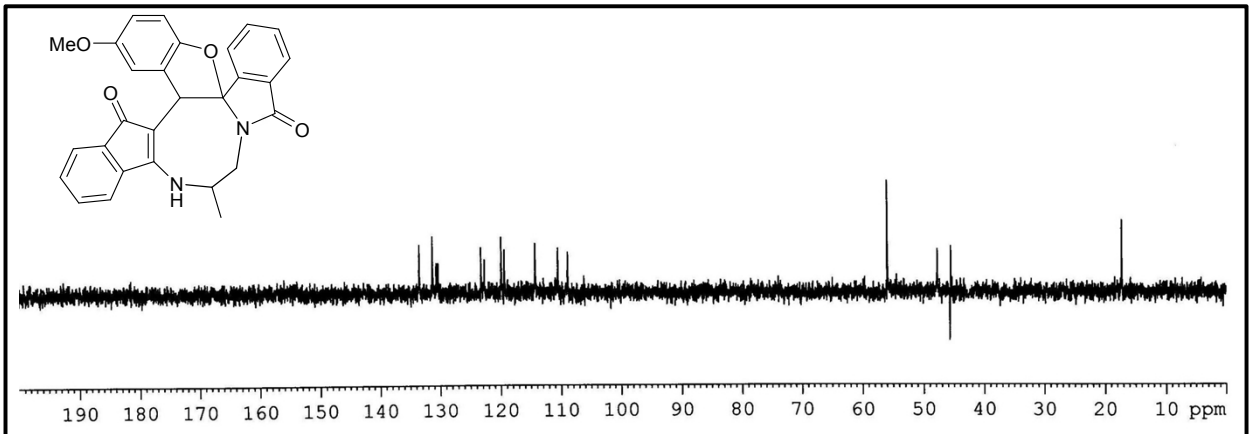

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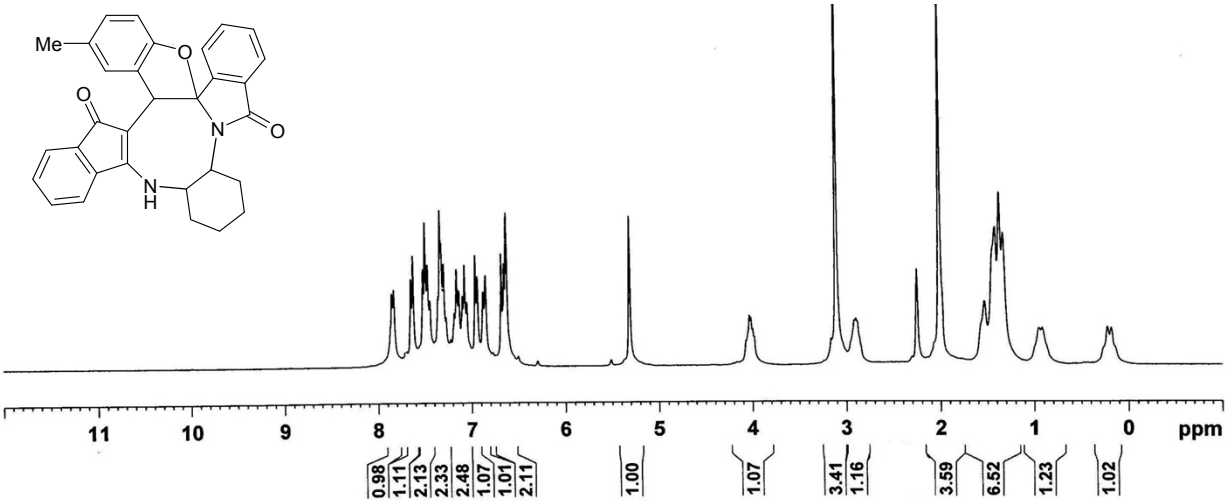

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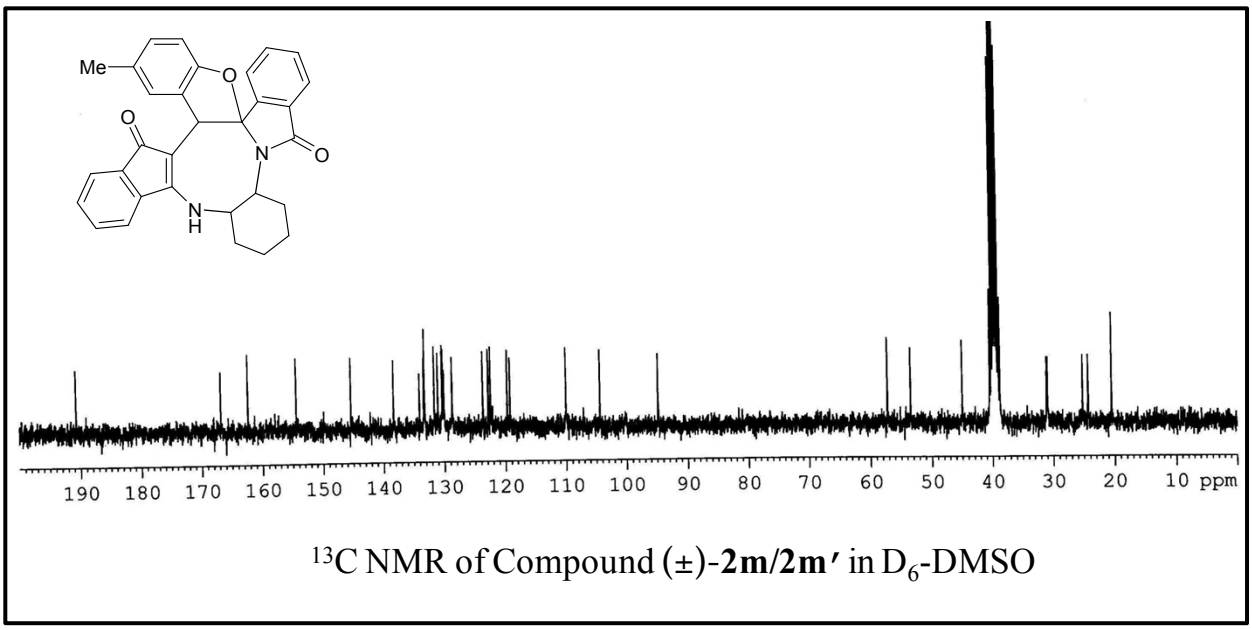

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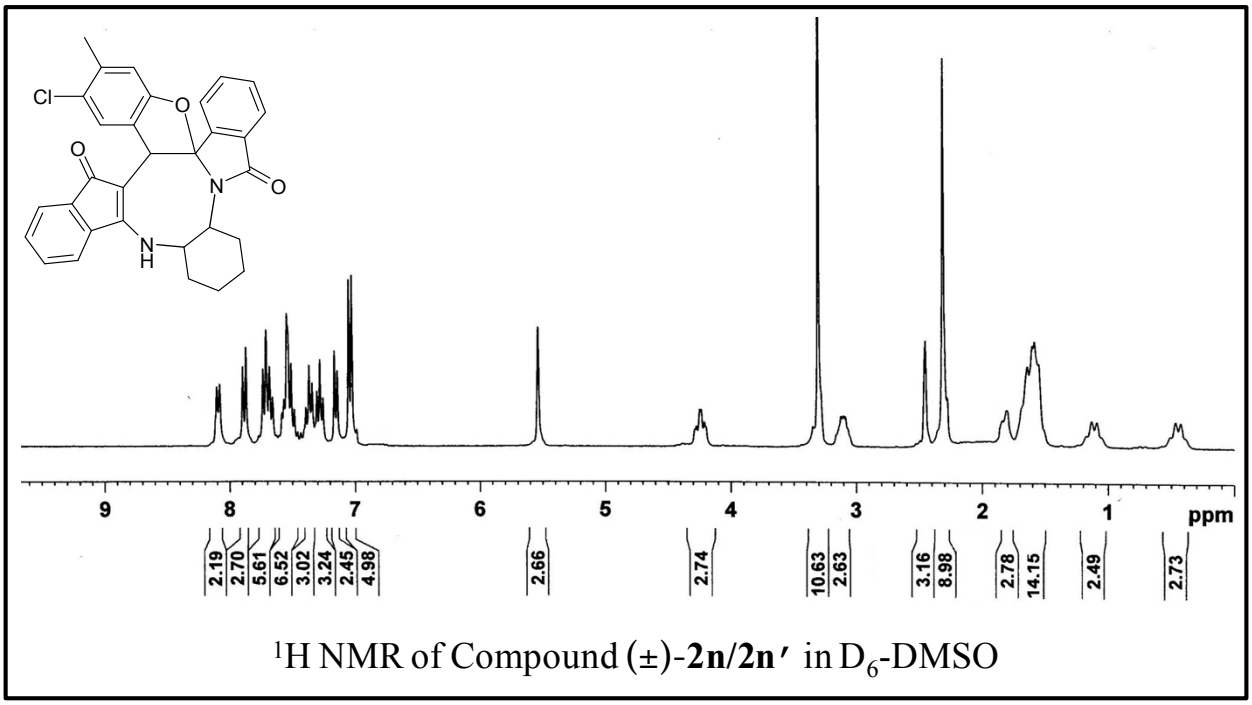

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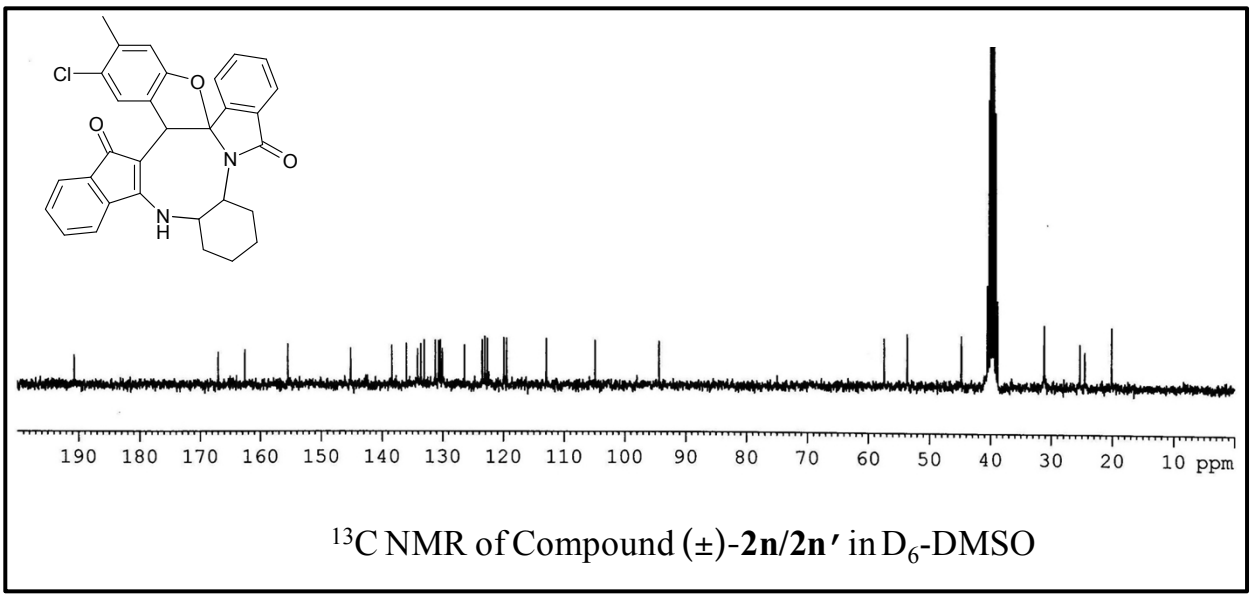

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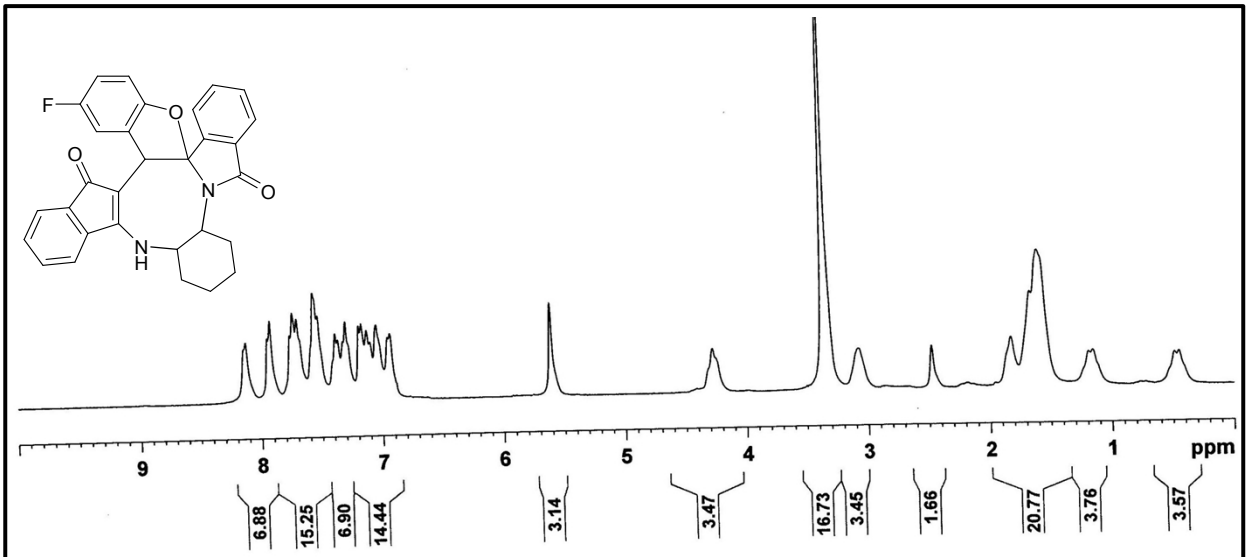

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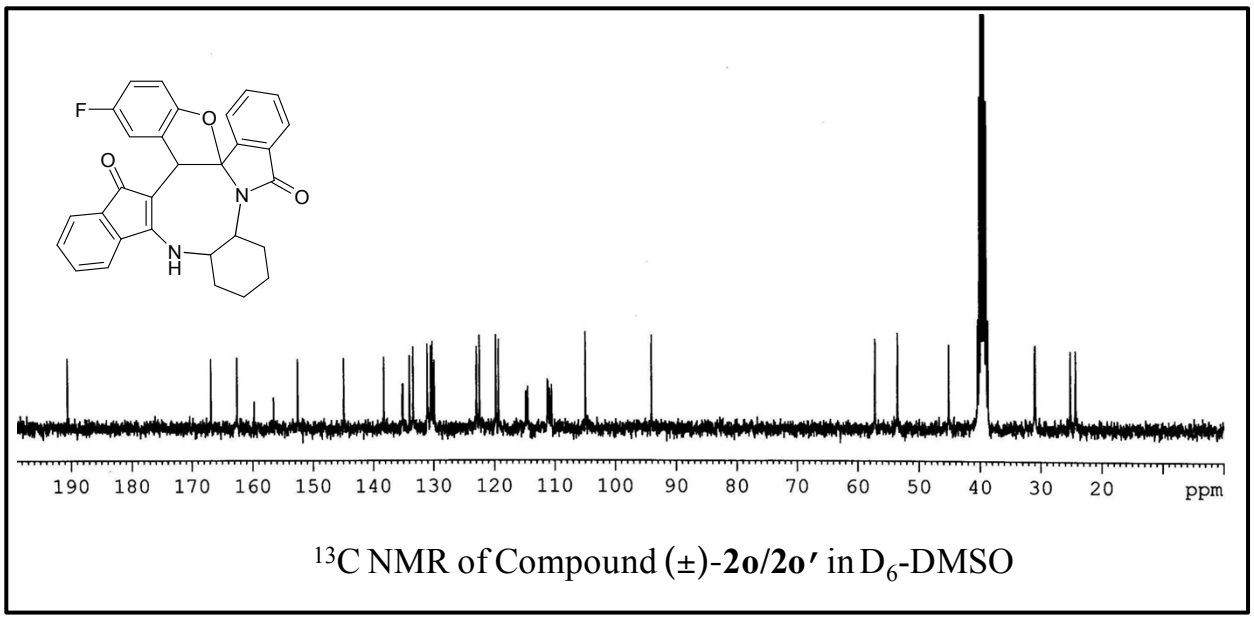

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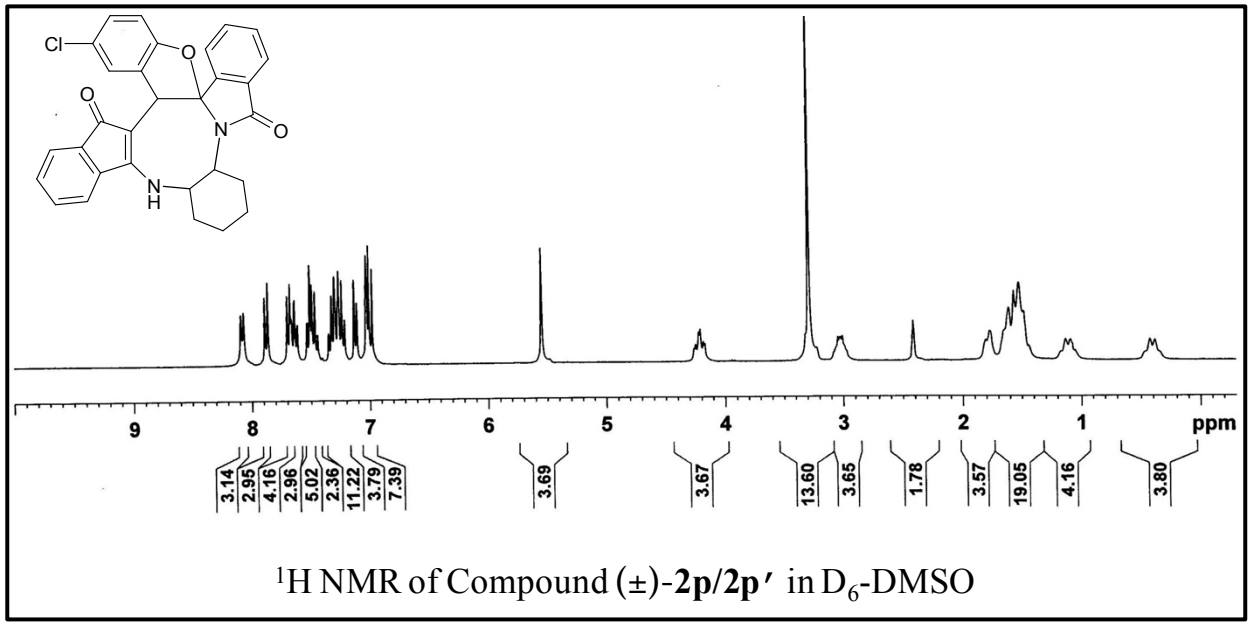

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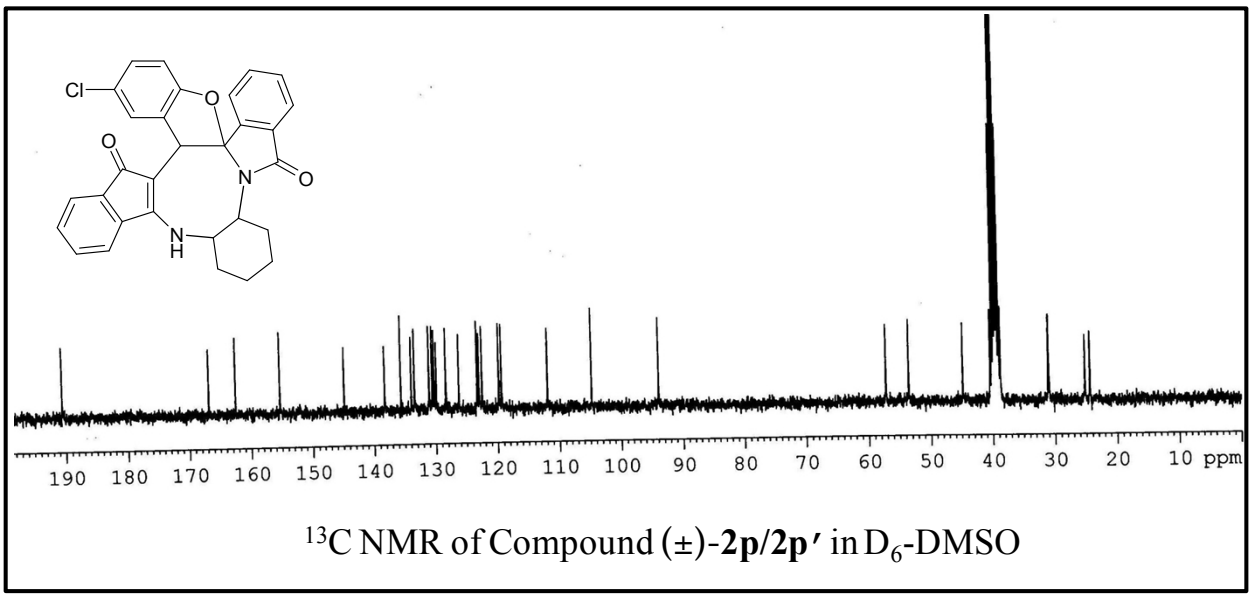

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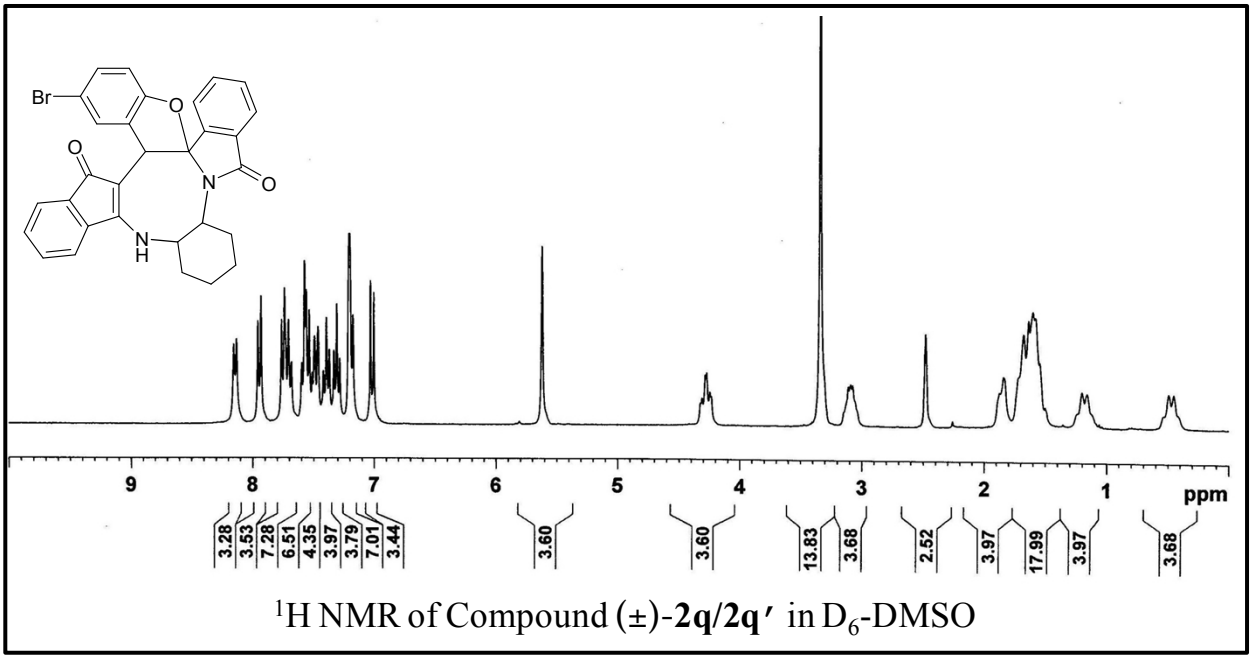

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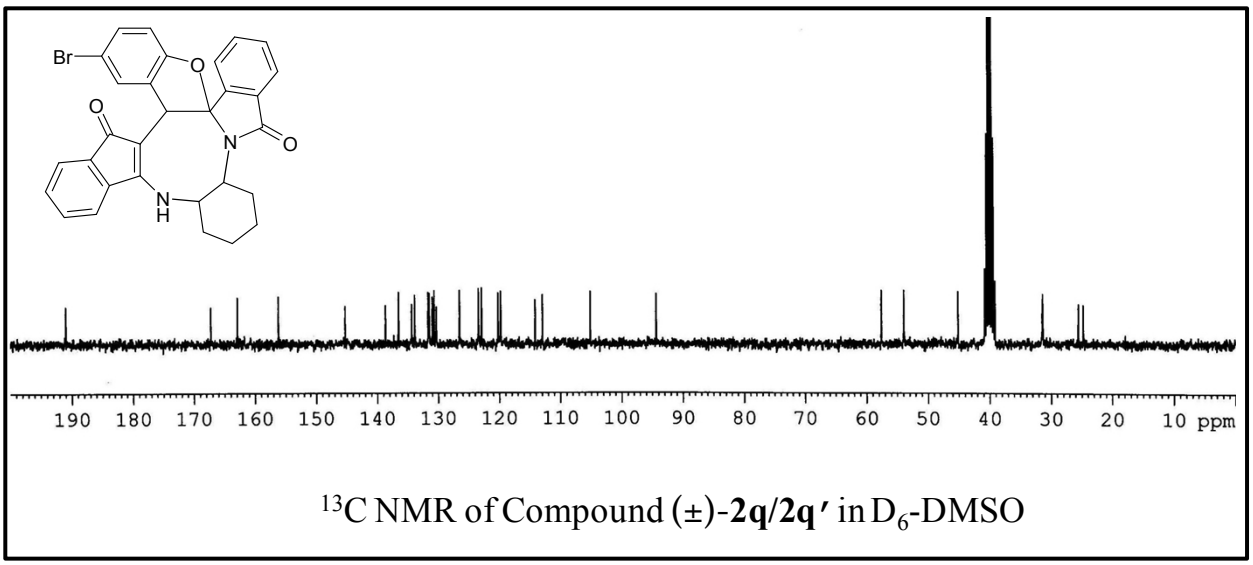

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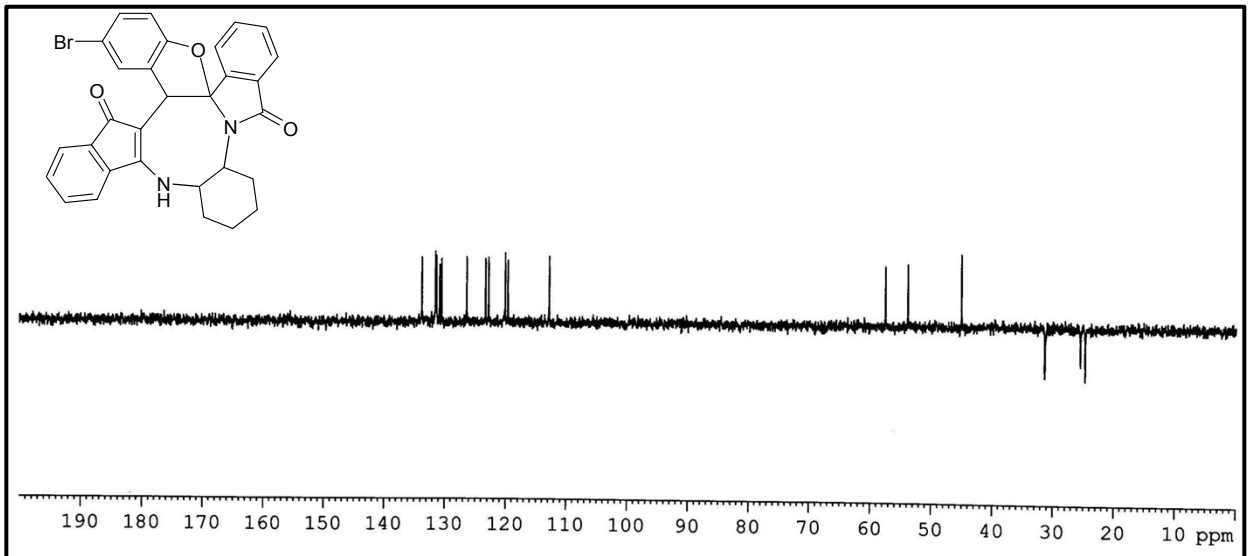
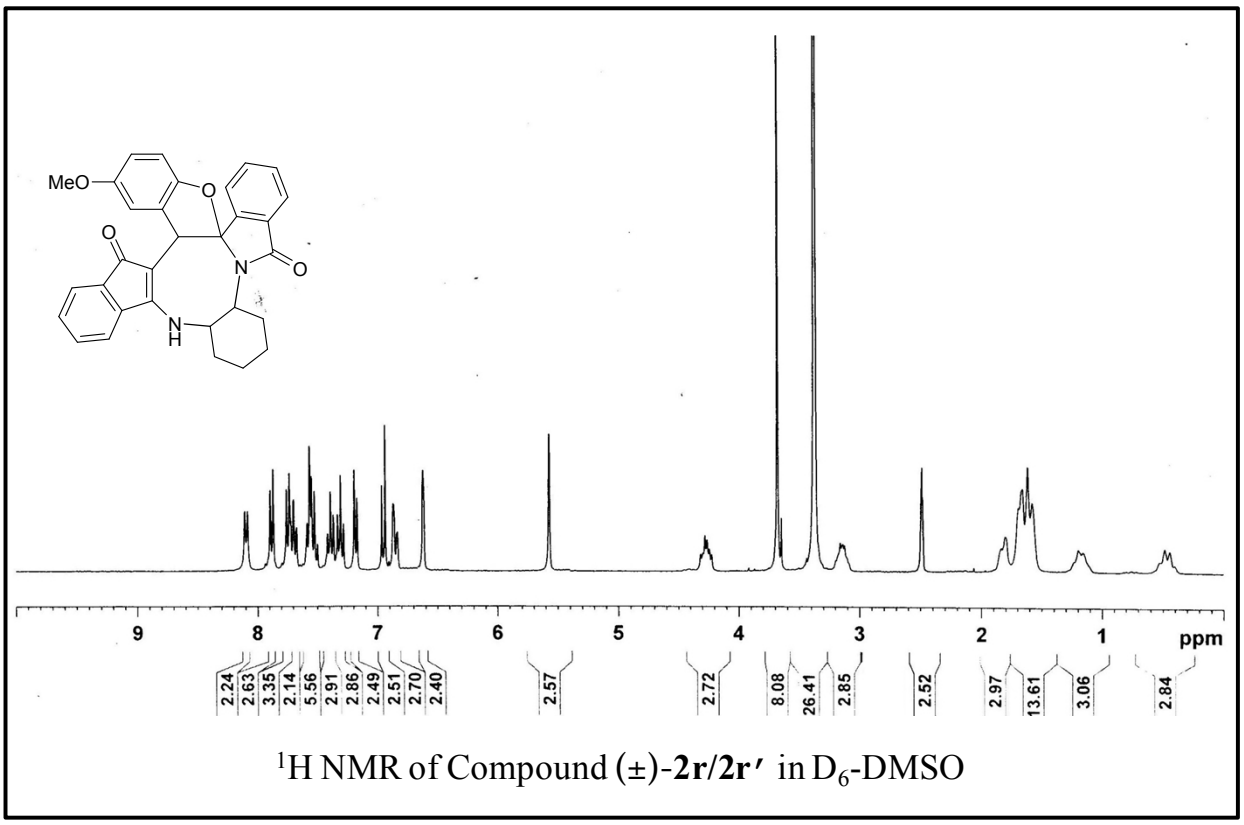


DEPT-135 of Compound (±)-**2q**/**2q′** in D_6-DMSO



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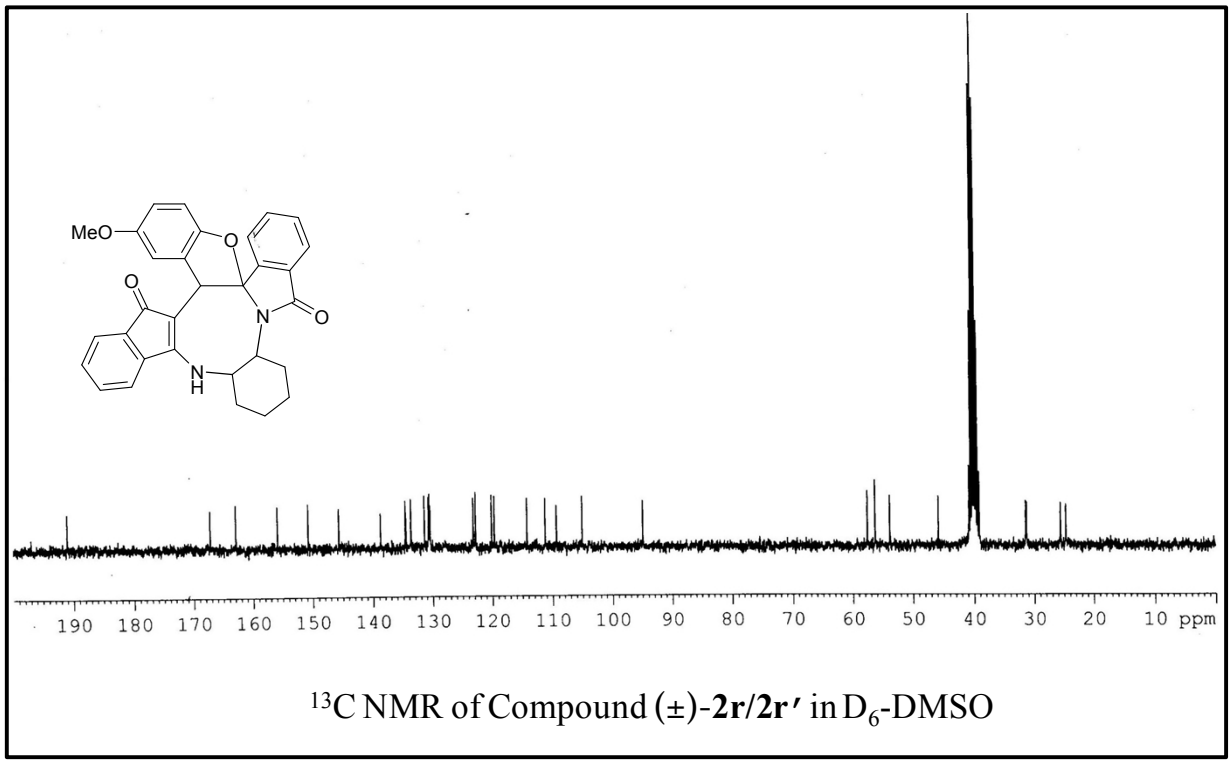

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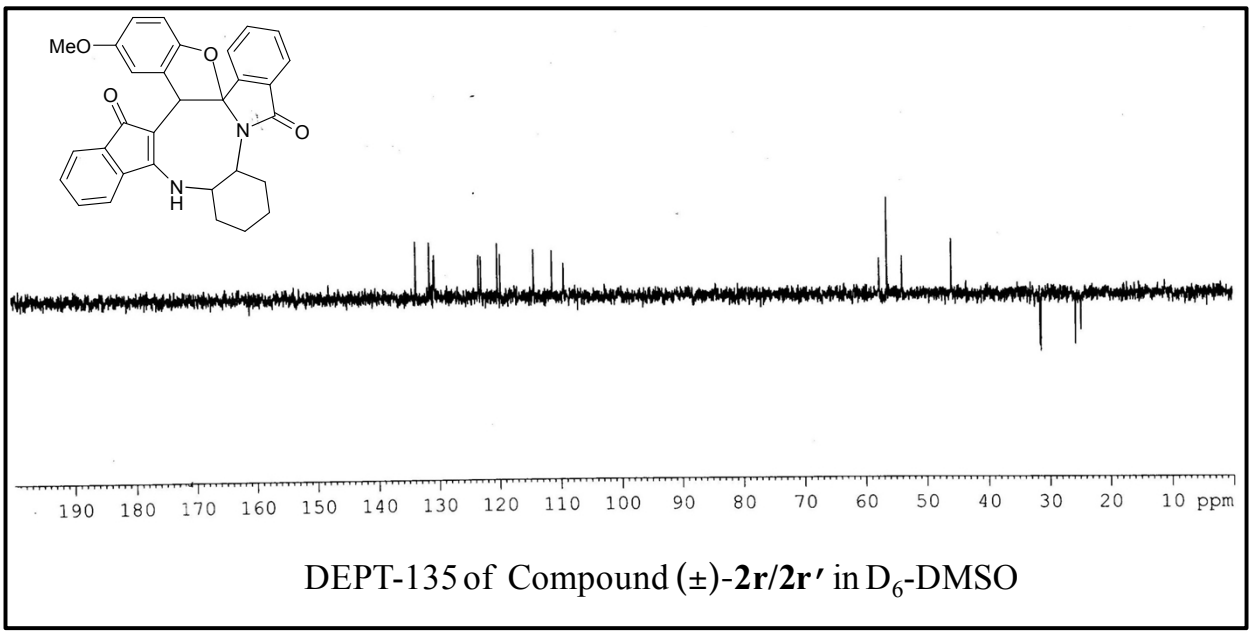

DEPT-135 of Compound (±)-**2r**/**2r′** in D_6-DMSO