

Supporting information

Application of novel metal-organic frameworks [Zr-Uio-66-PDC-SO₃H]FeCl₄ in synthesis of dihydrobenzo[*g*]pyrimido[4,5-*b*]quinoline derivatives

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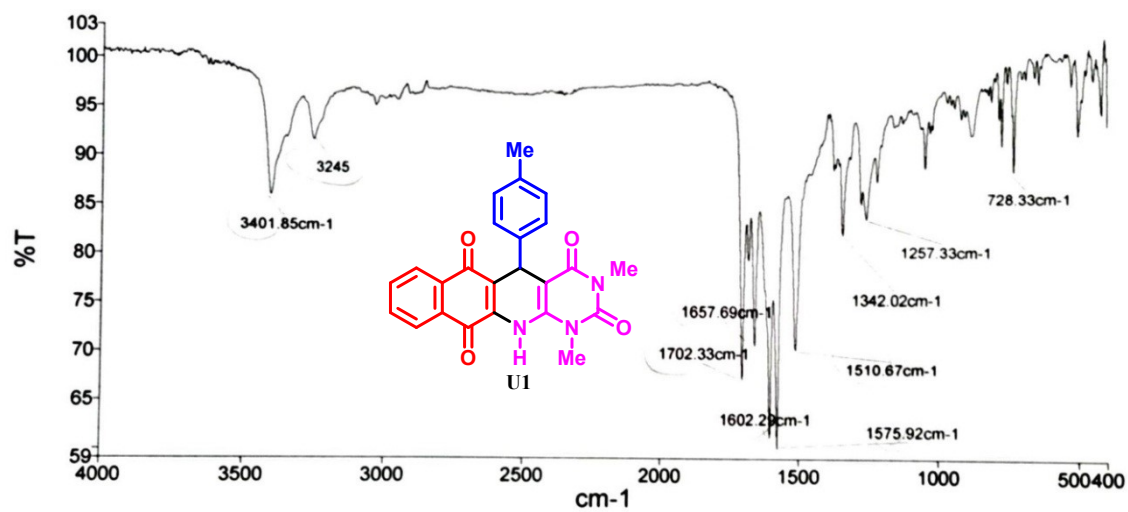
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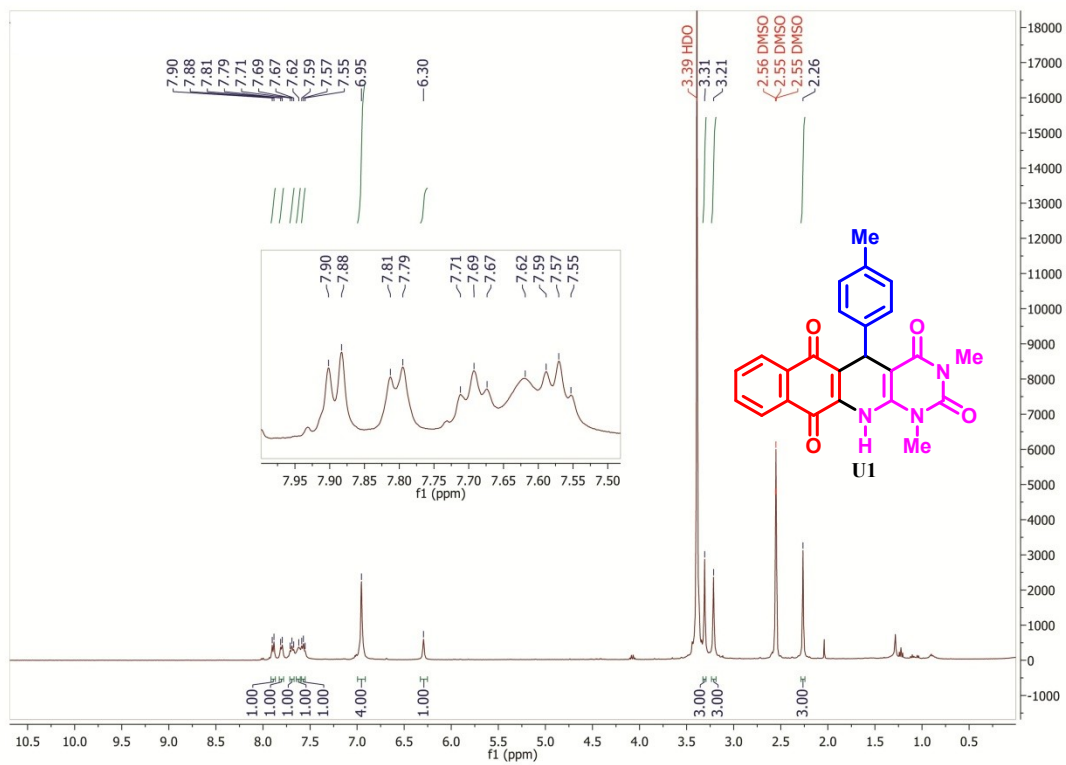
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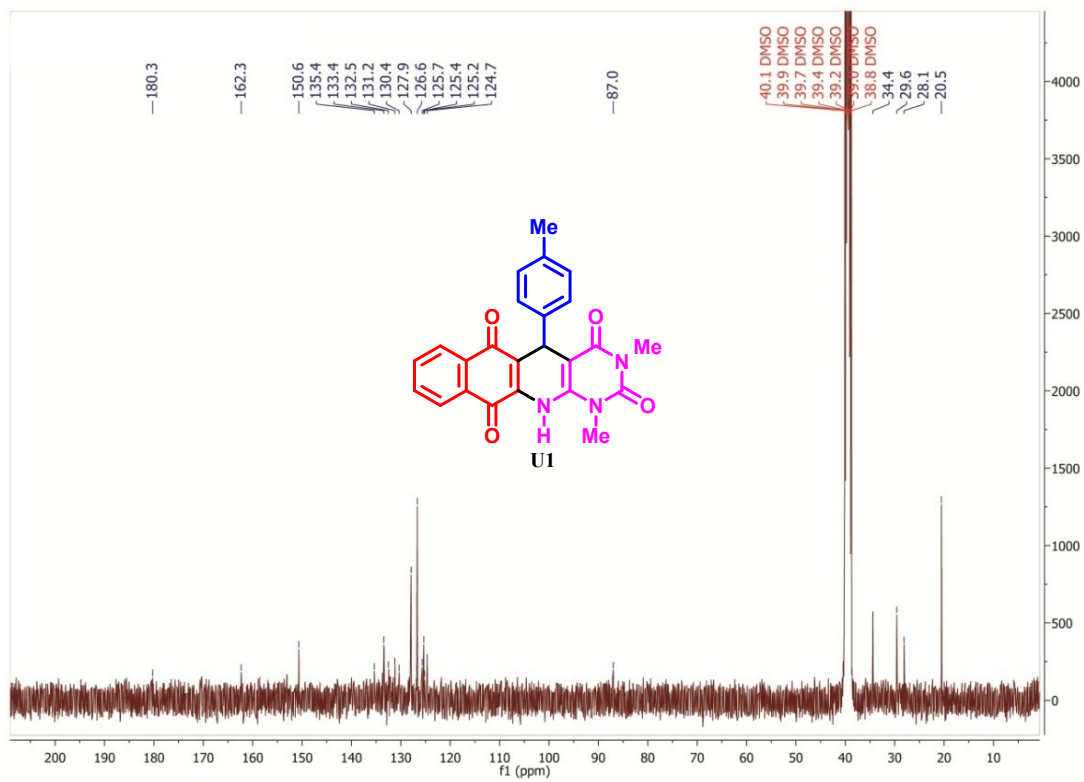
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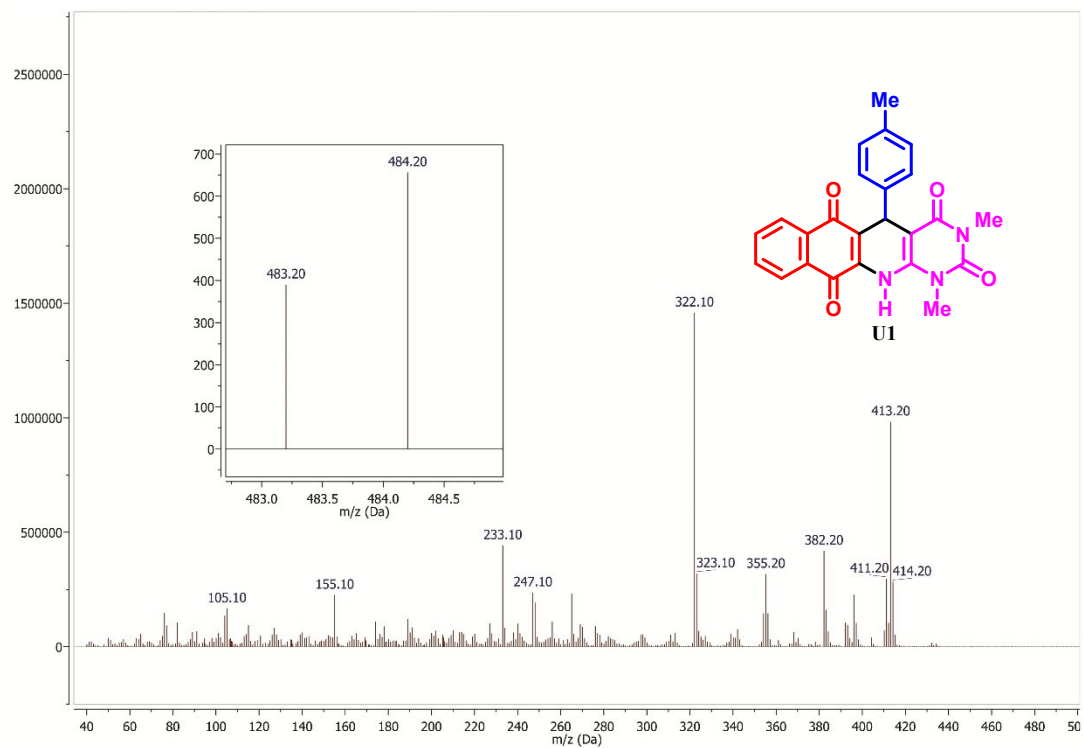
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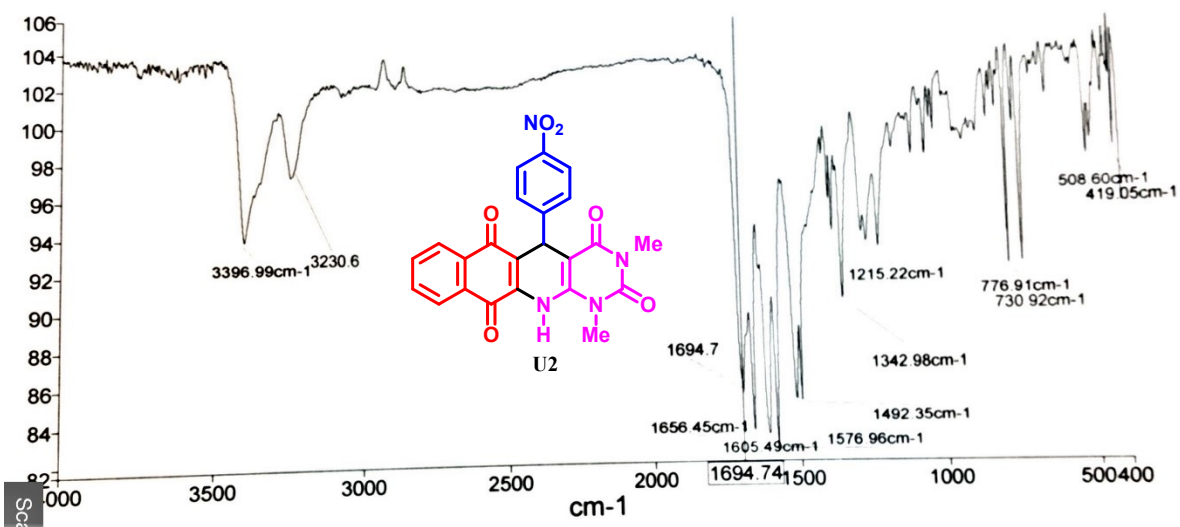
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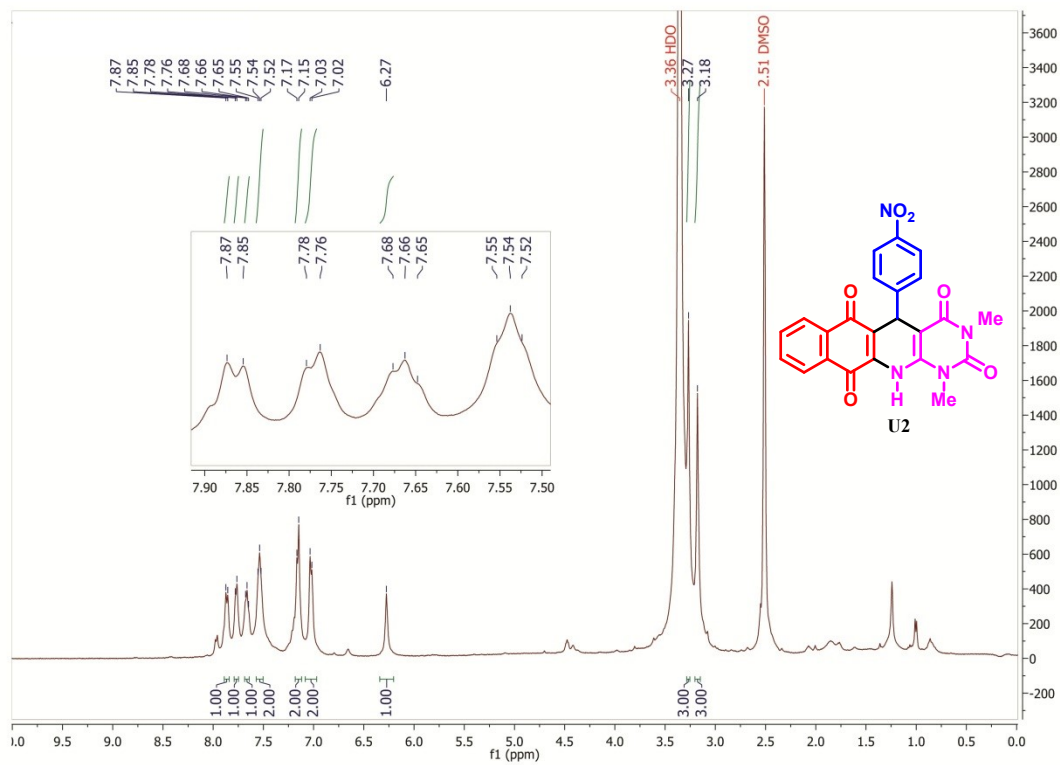
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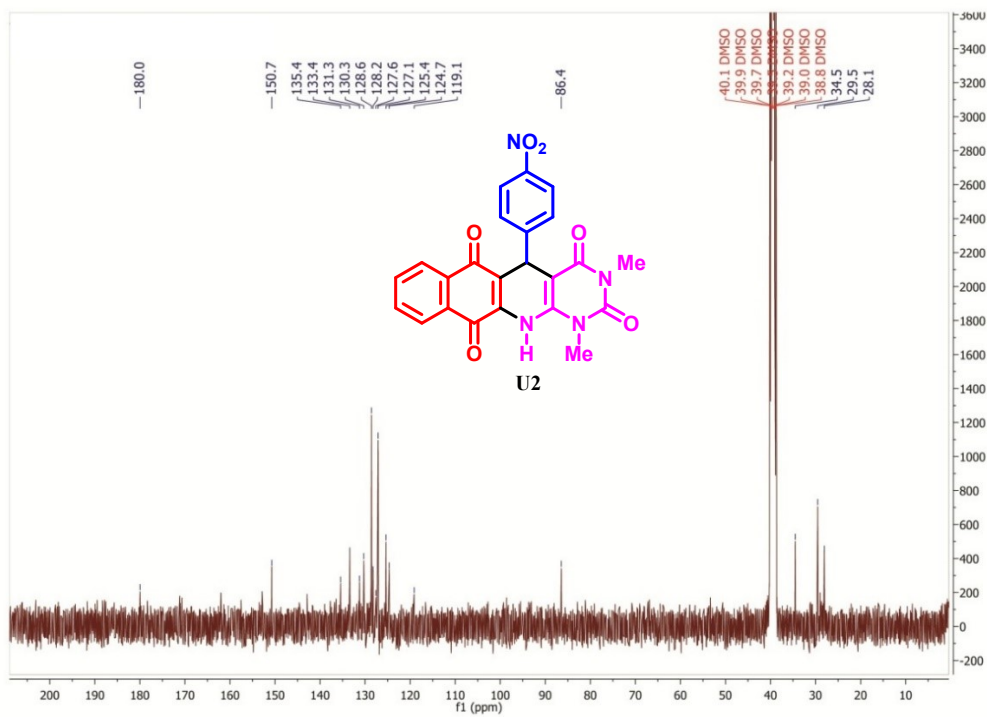
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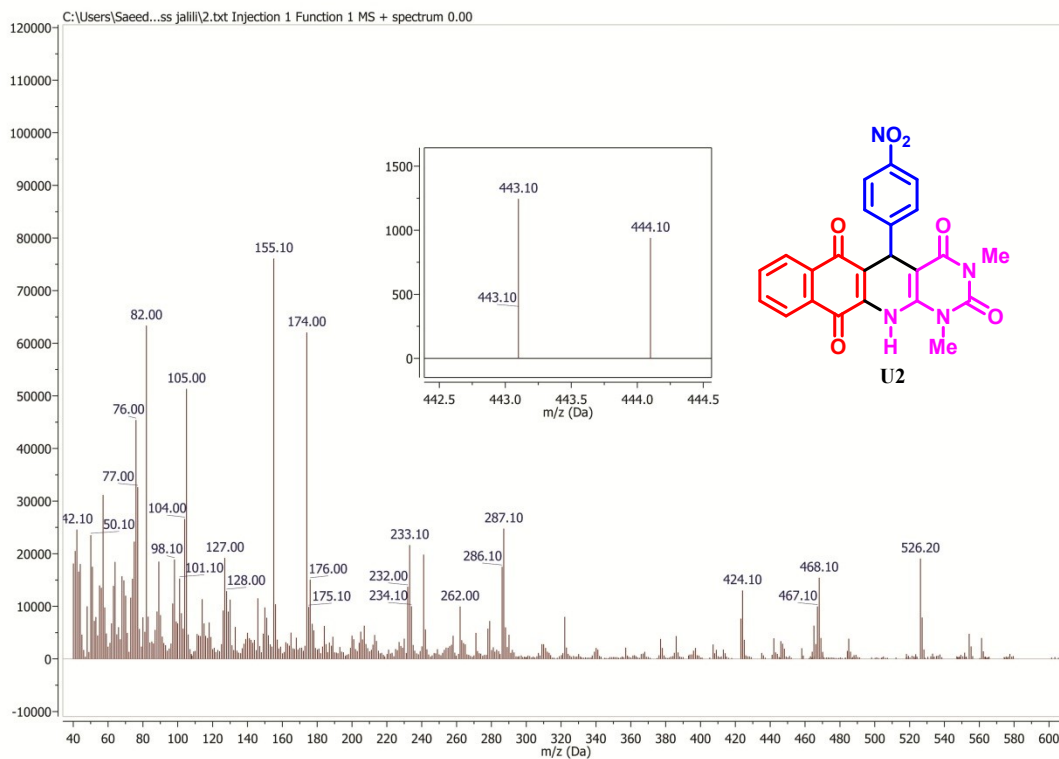
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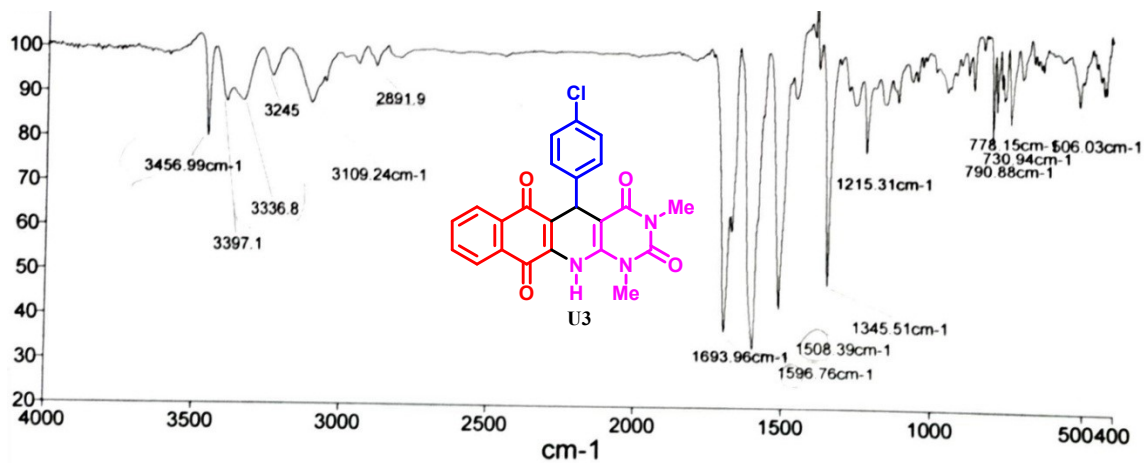
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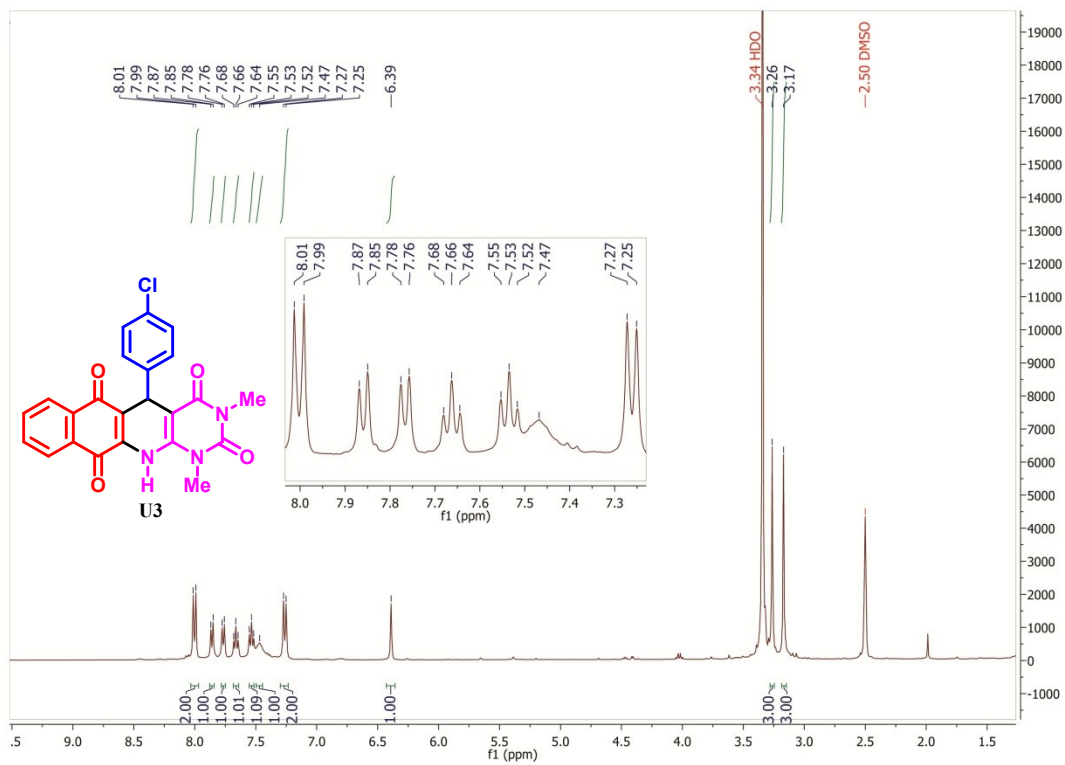
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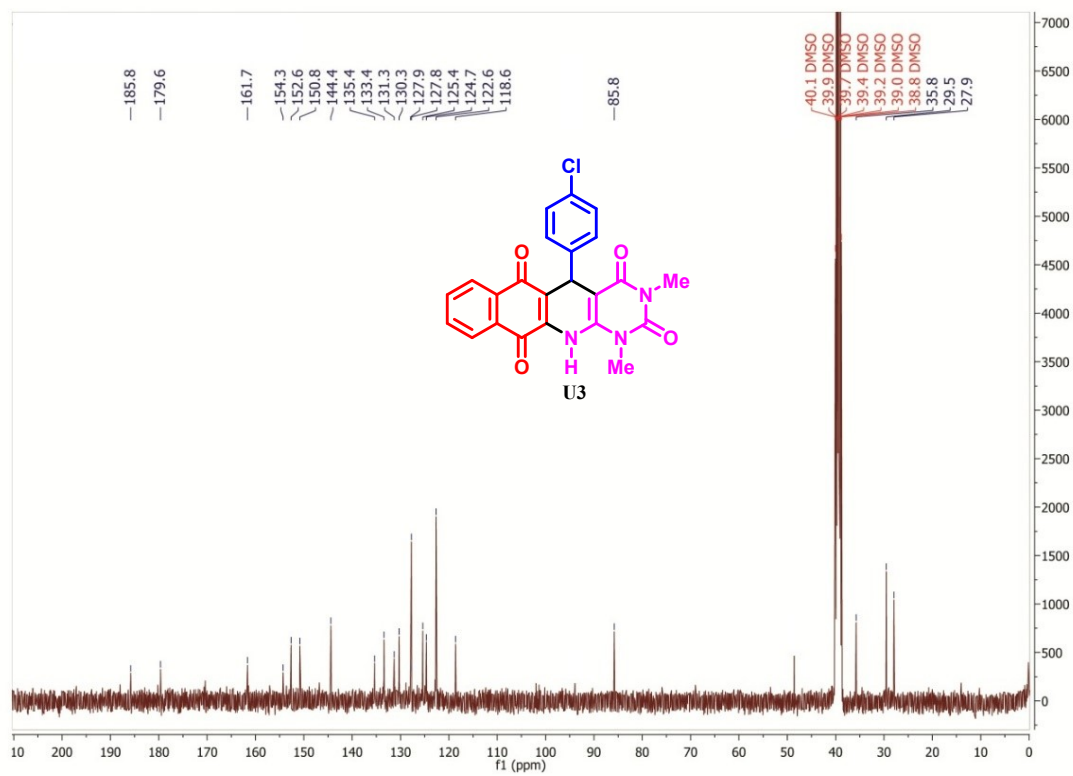
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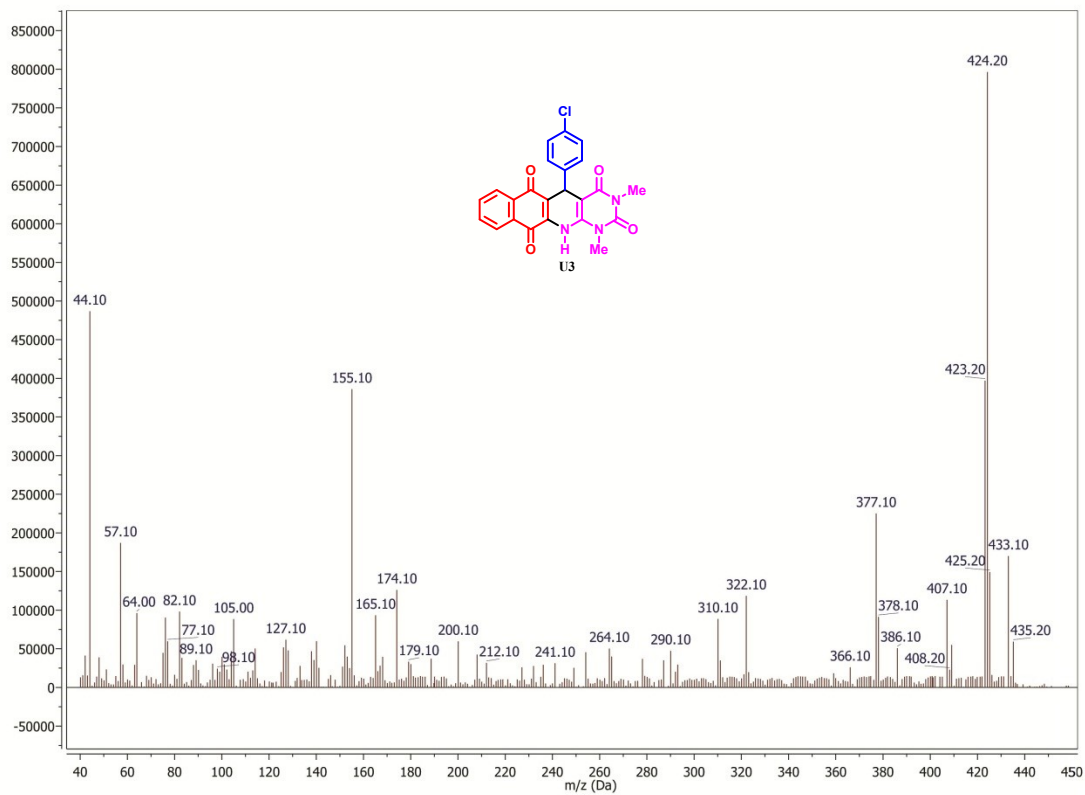
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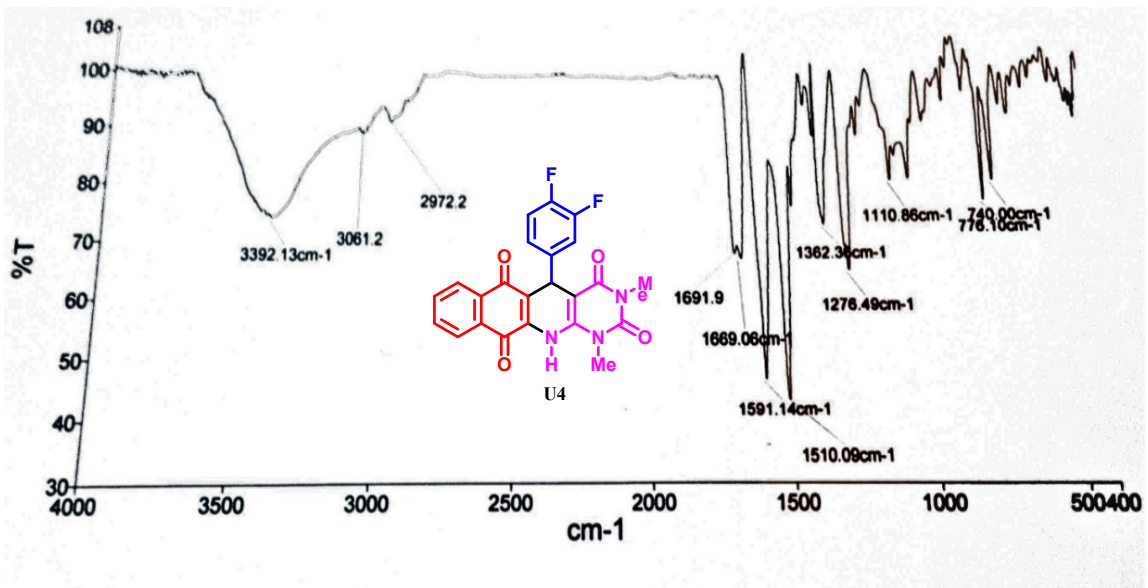
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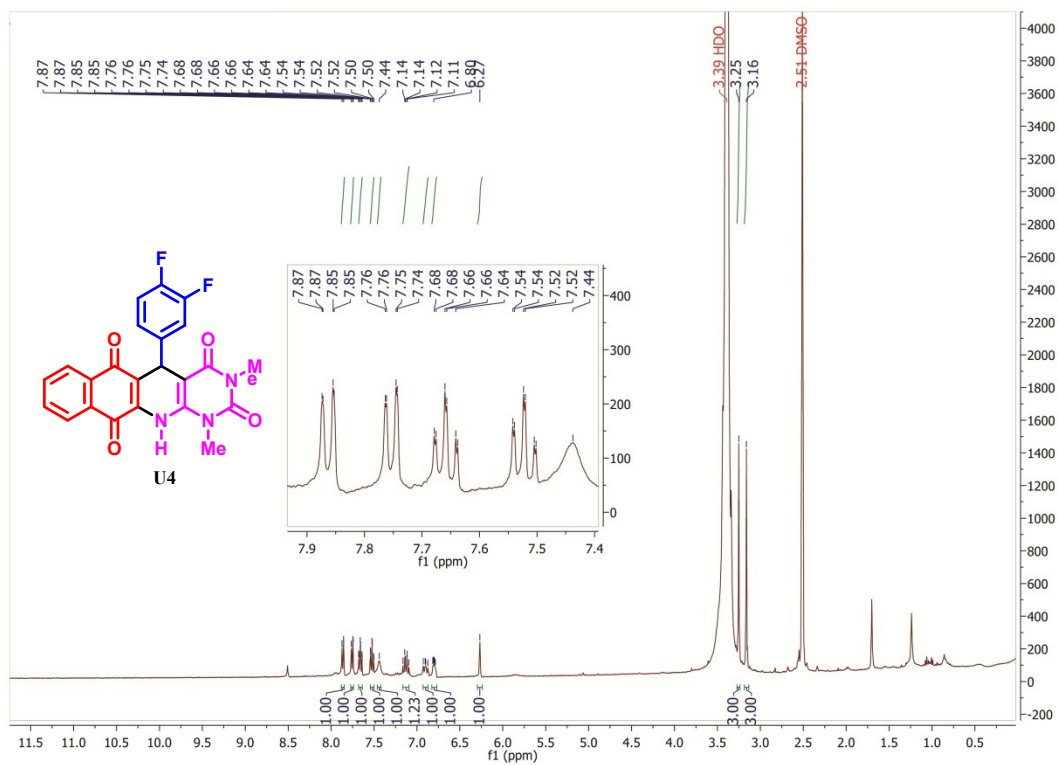
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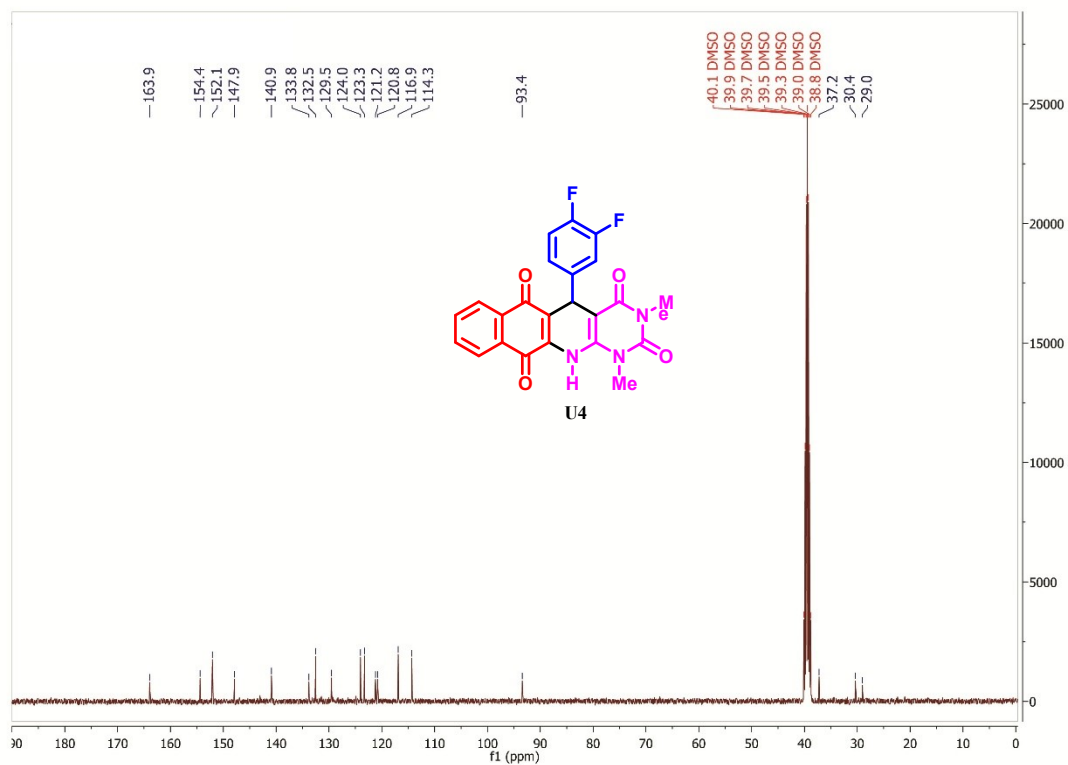
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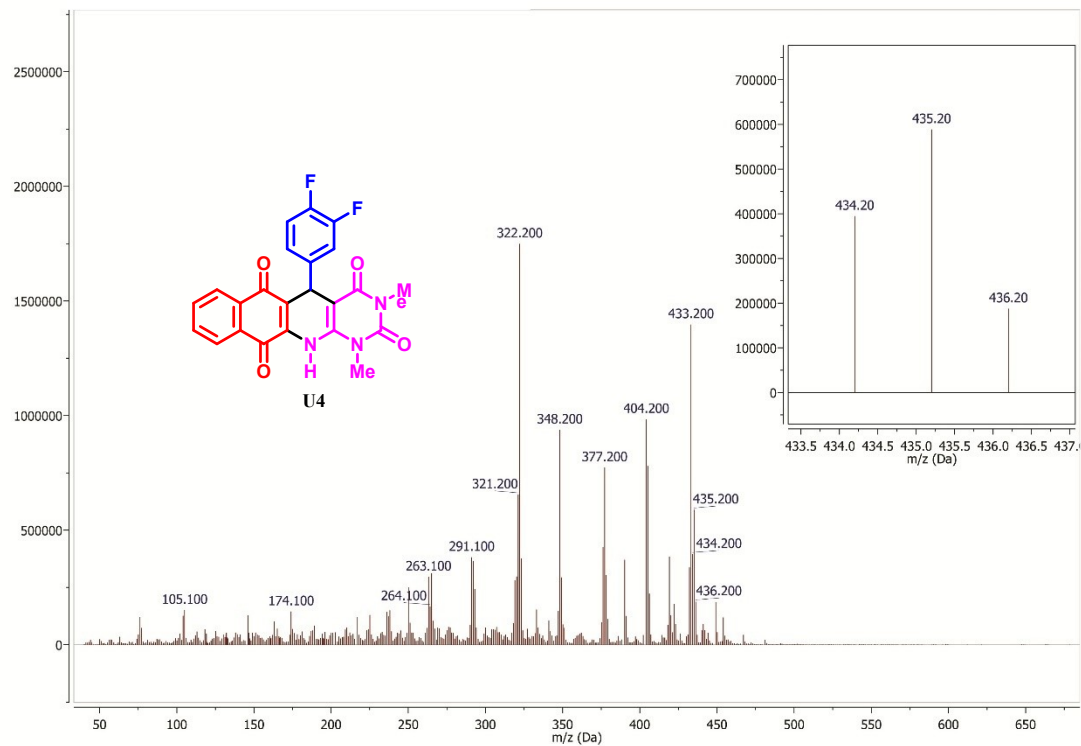
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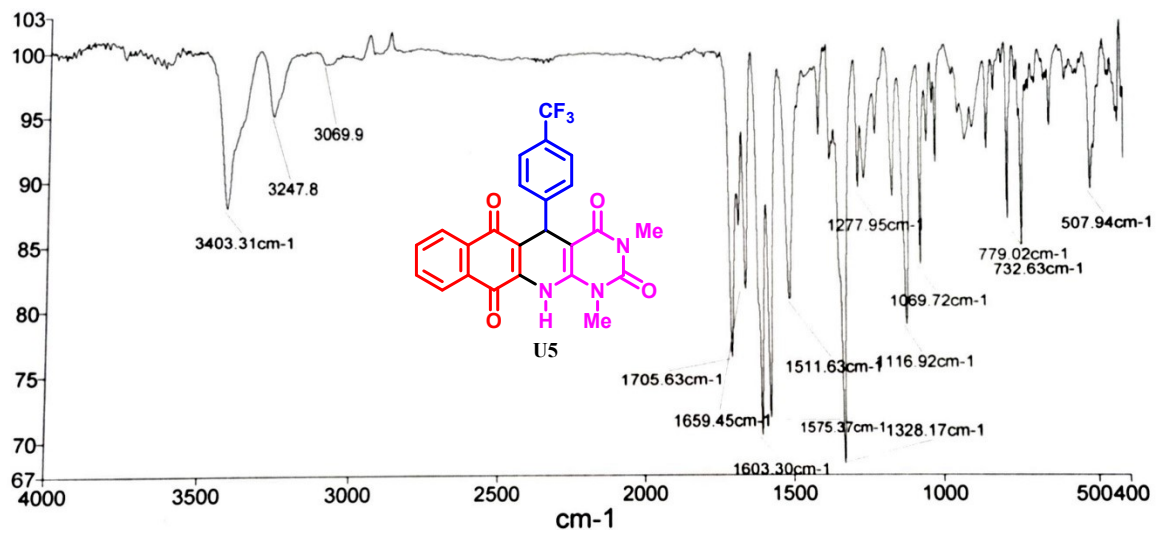
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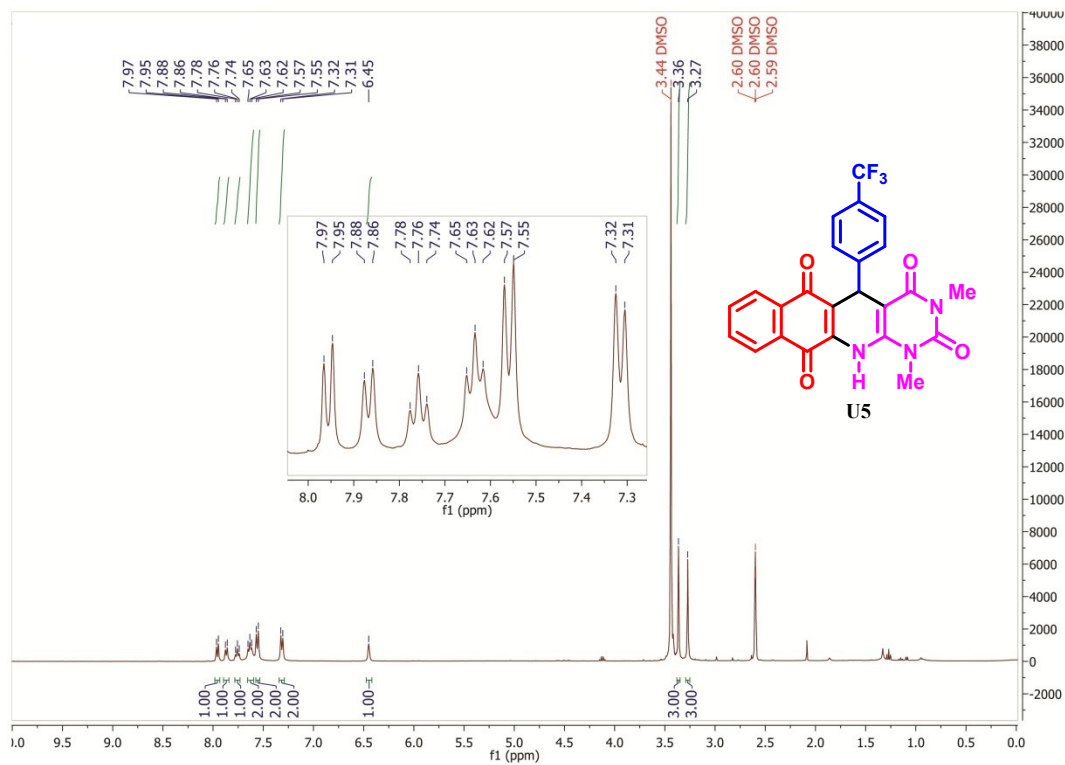
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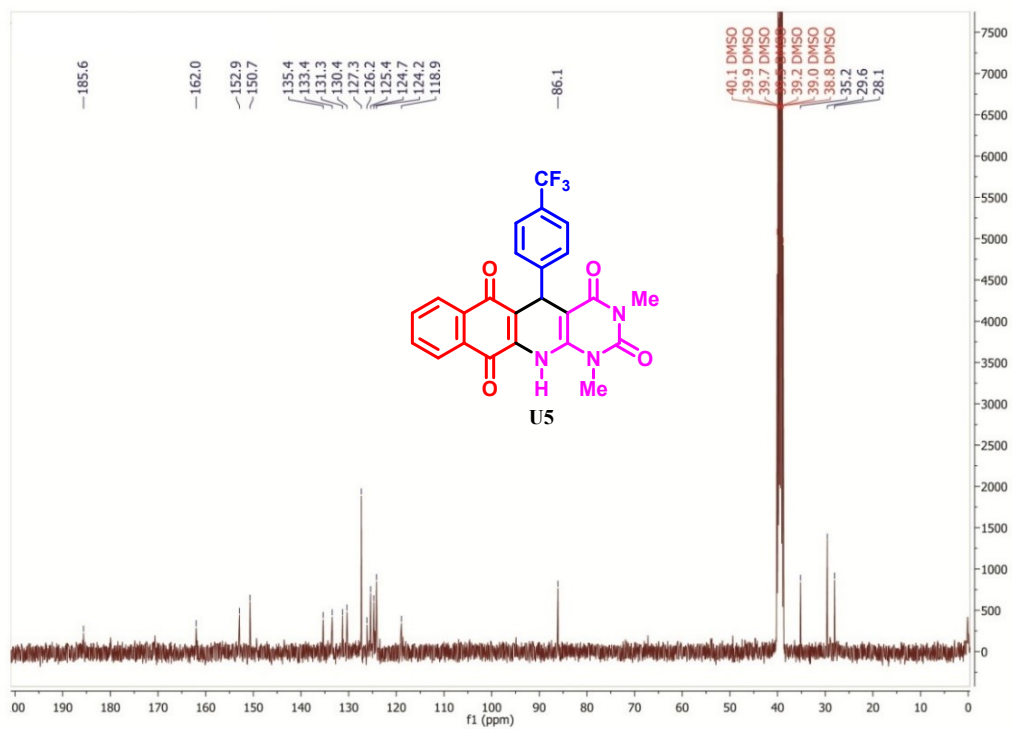
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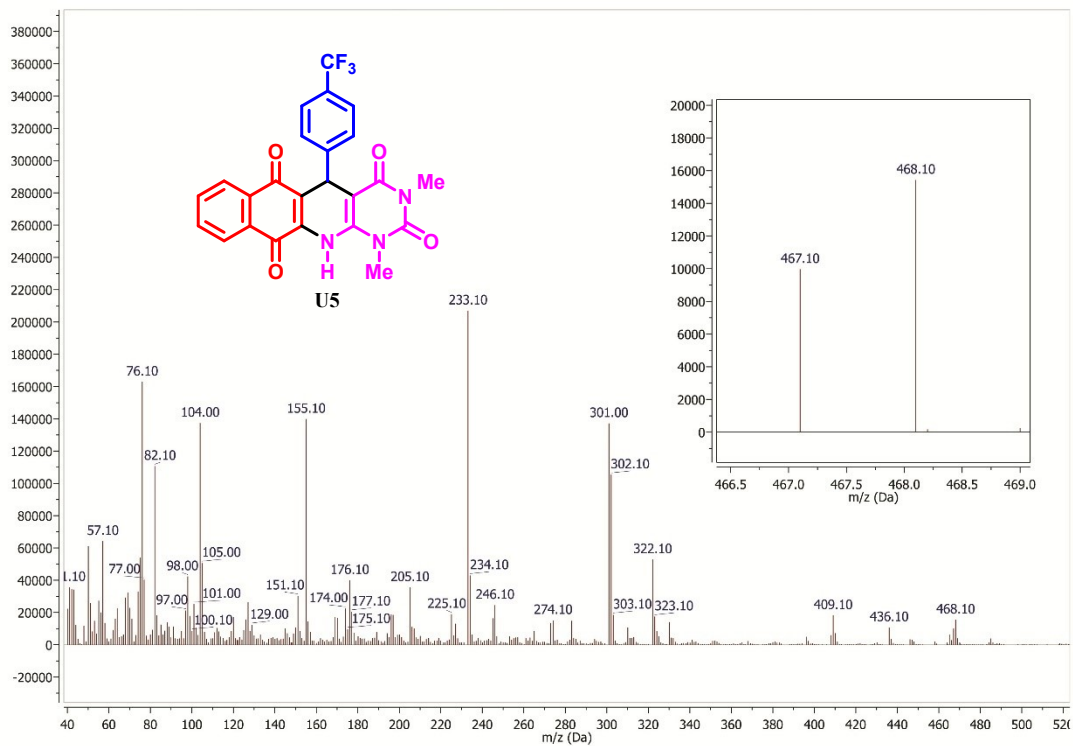
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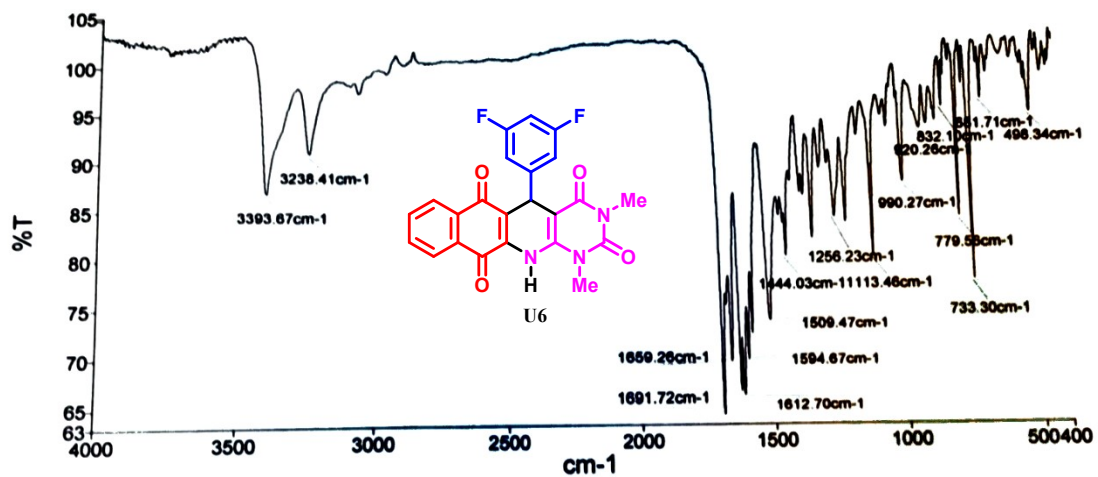
¹H NMR spectrum of 1,3-dimethyl-5-(4-(trifluoromethyl)phenyl)-5,12-dihydrobenzo[g]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U5).



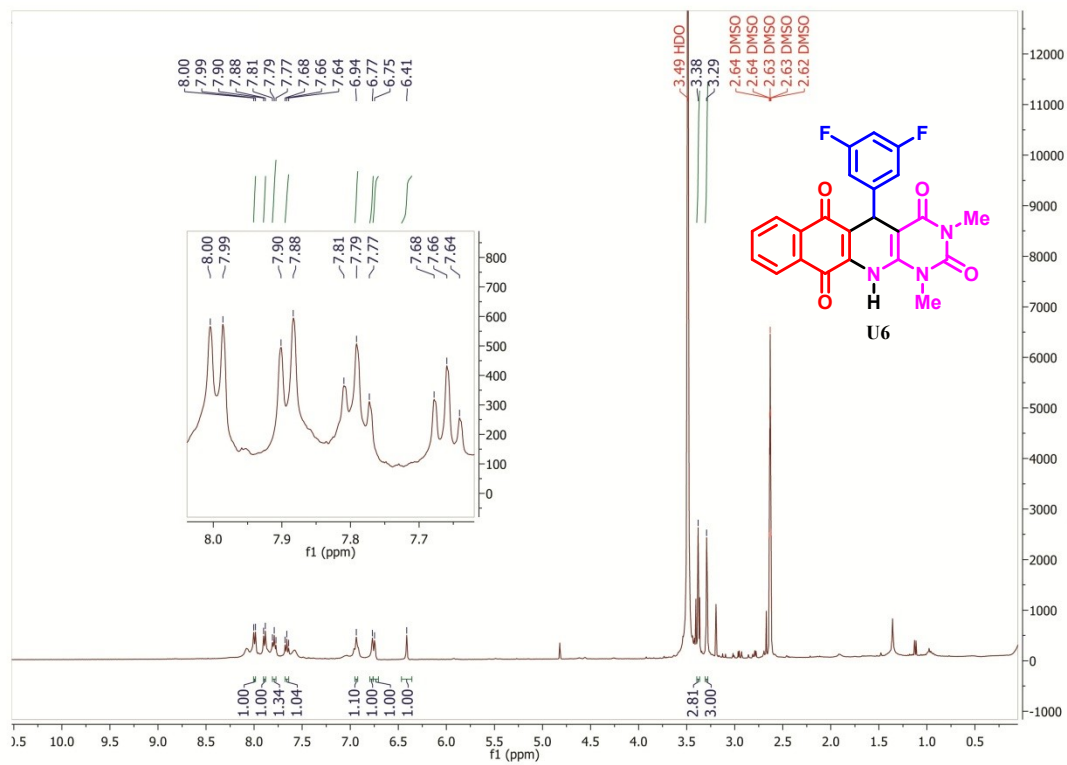
¹³C NMR spectrum of 1,3-dimethyl-5-(4-(trifluoromethyl)phenyl)-5,12-dihydrobenzo[g]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U5).



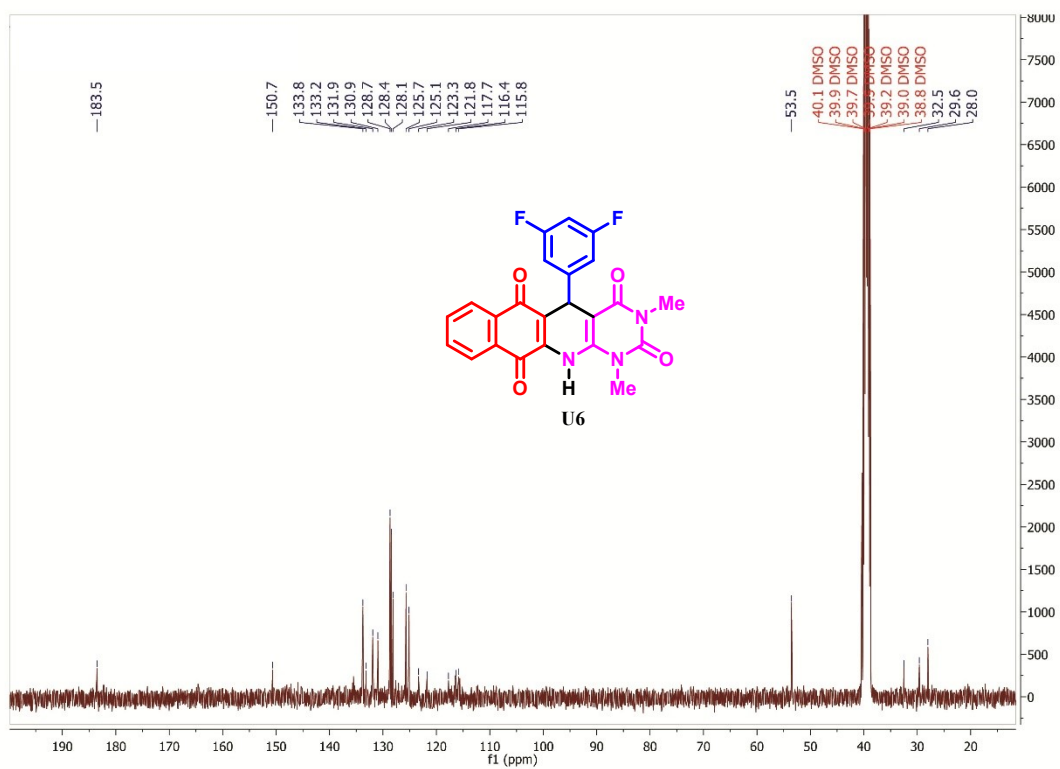
Mass spectrum of 1,3-dimethyl-5-(4-(trifluoromethyl)phenyl)-5,12-dihydrobenzo[g]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U5).



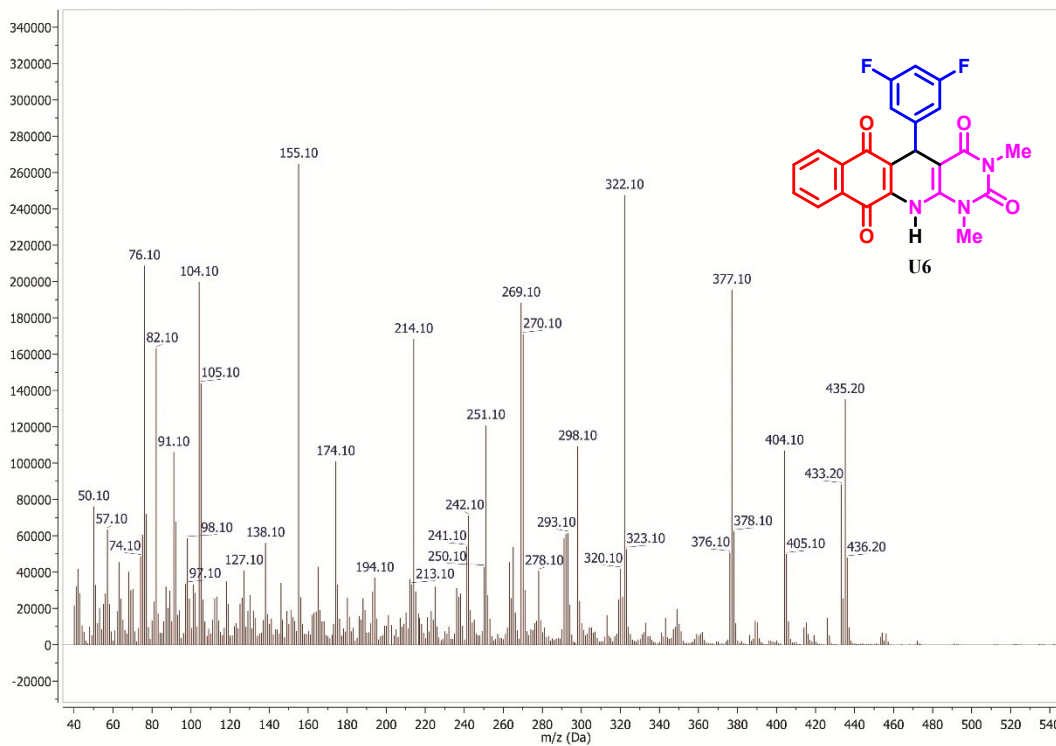
FT-IR spectrum of 5-(3,5-difluorophenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U6).



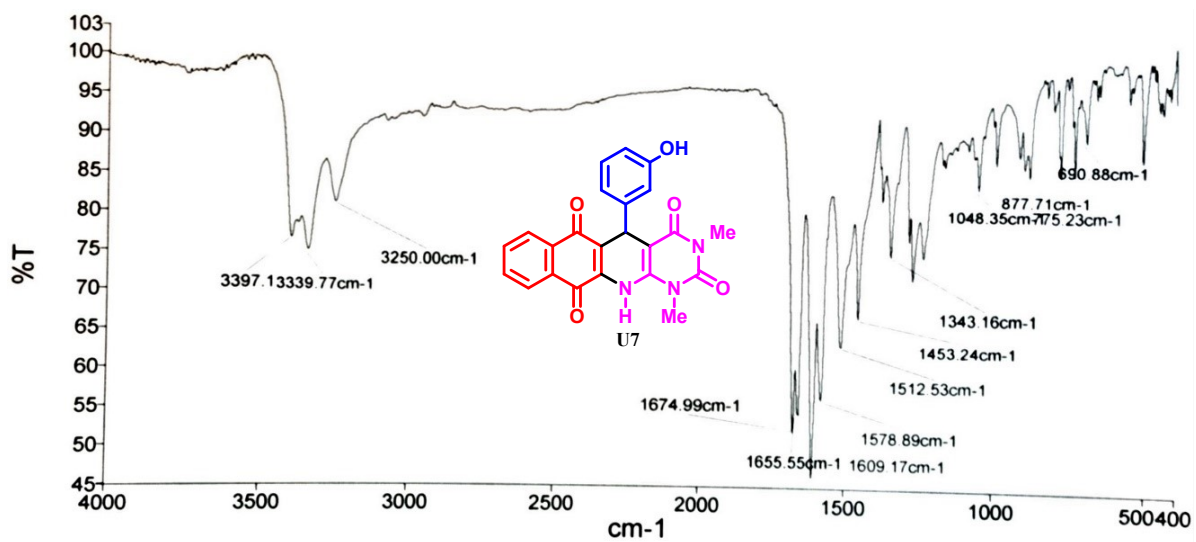
¹H NMR spectrum of 5-(3,5-difluorophenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U6).



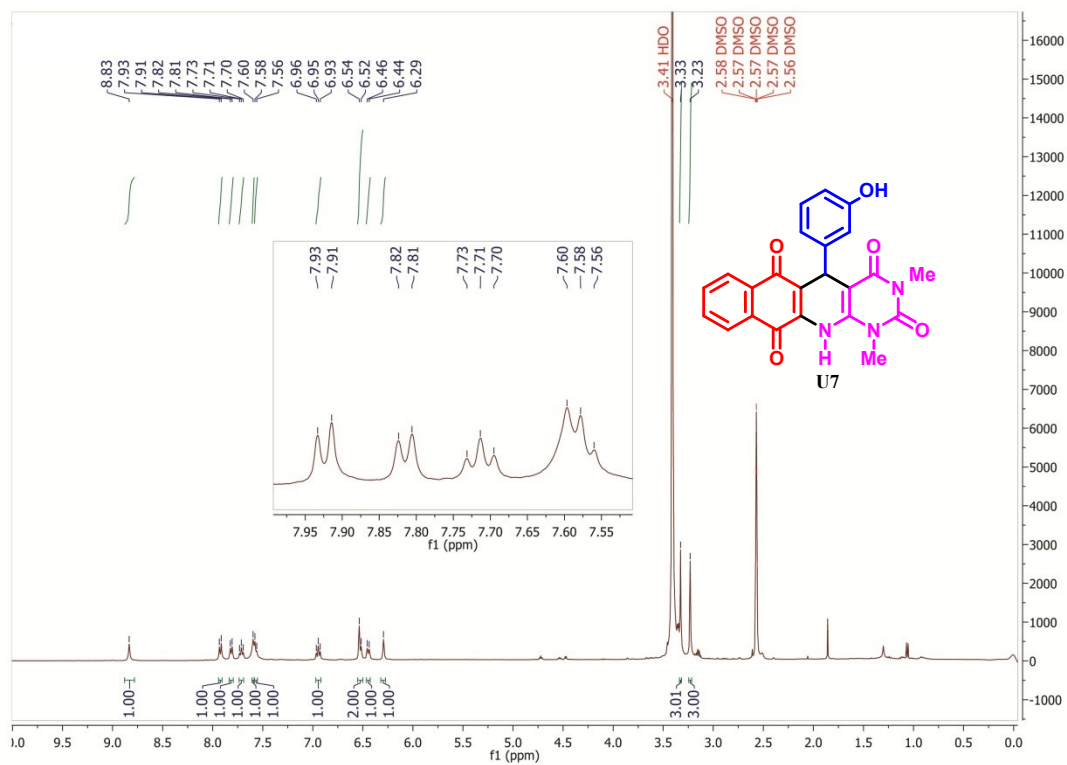
¹³C NMR spectrum of 5-(3,5-difluorophenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U6).



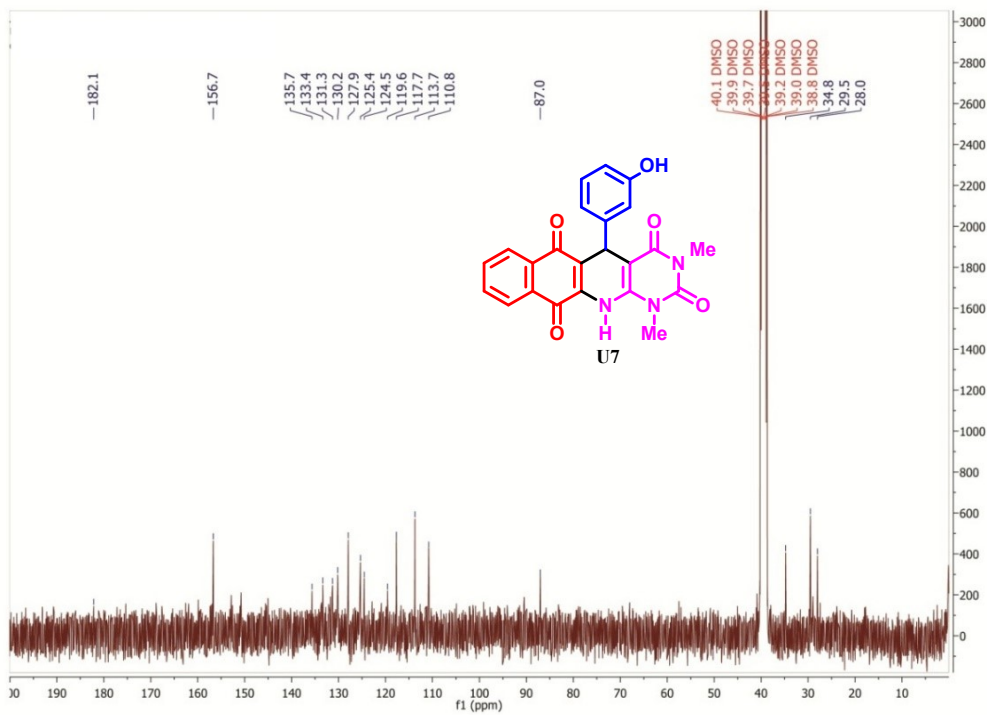
Mass spectrum of 5-(3,5-difluorophenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U6).



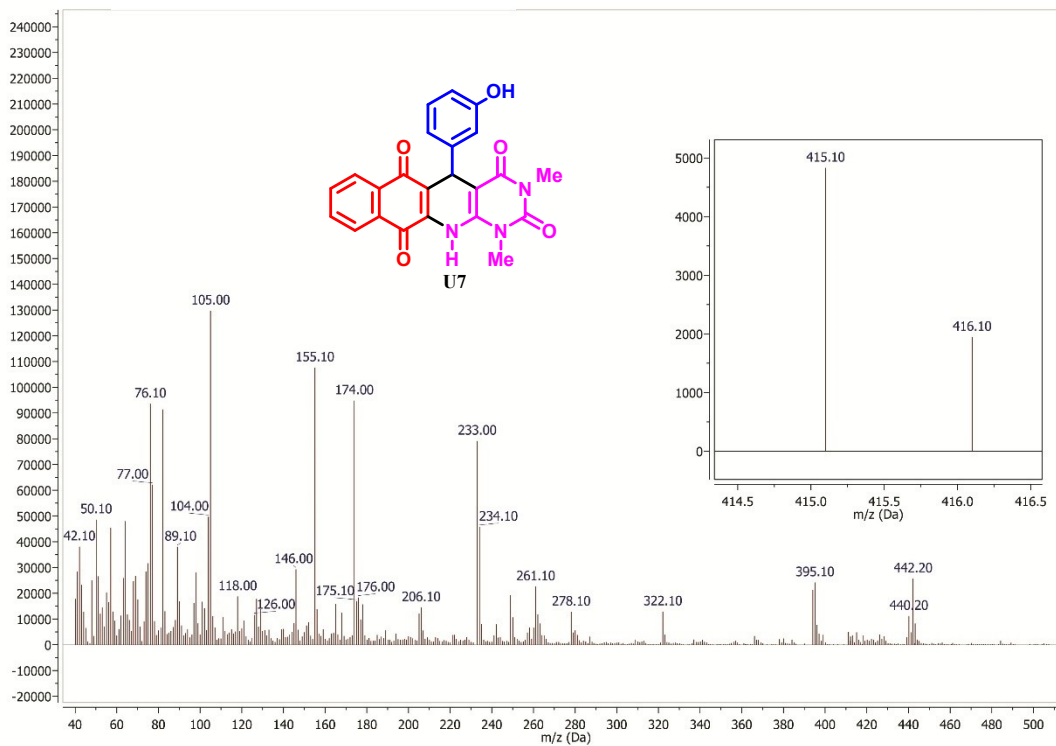
FT-IR spectrum of 5-(3-hydroxyphenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U7).



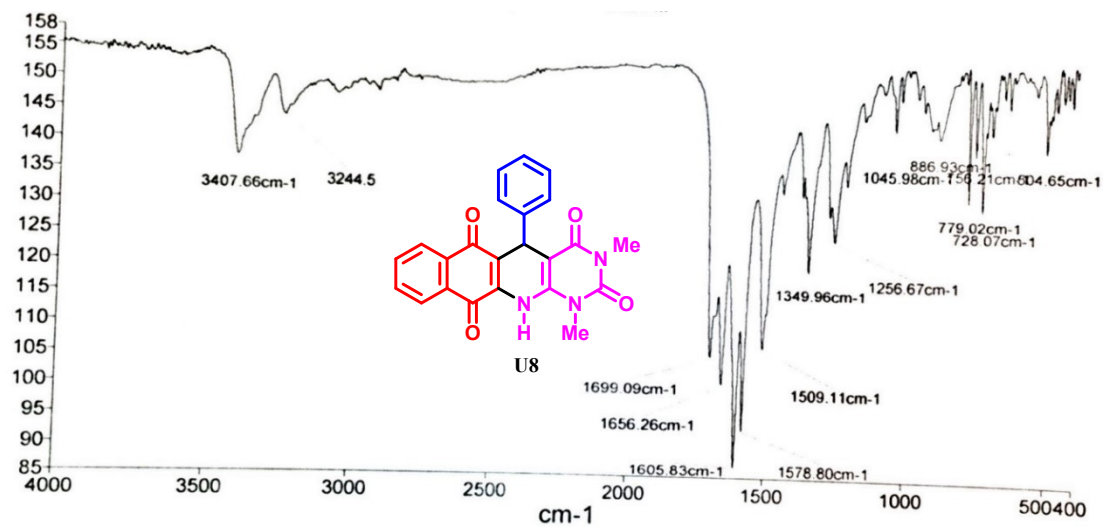
¹H NMR spectrum of 5-(3-hydroxyphenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U7).



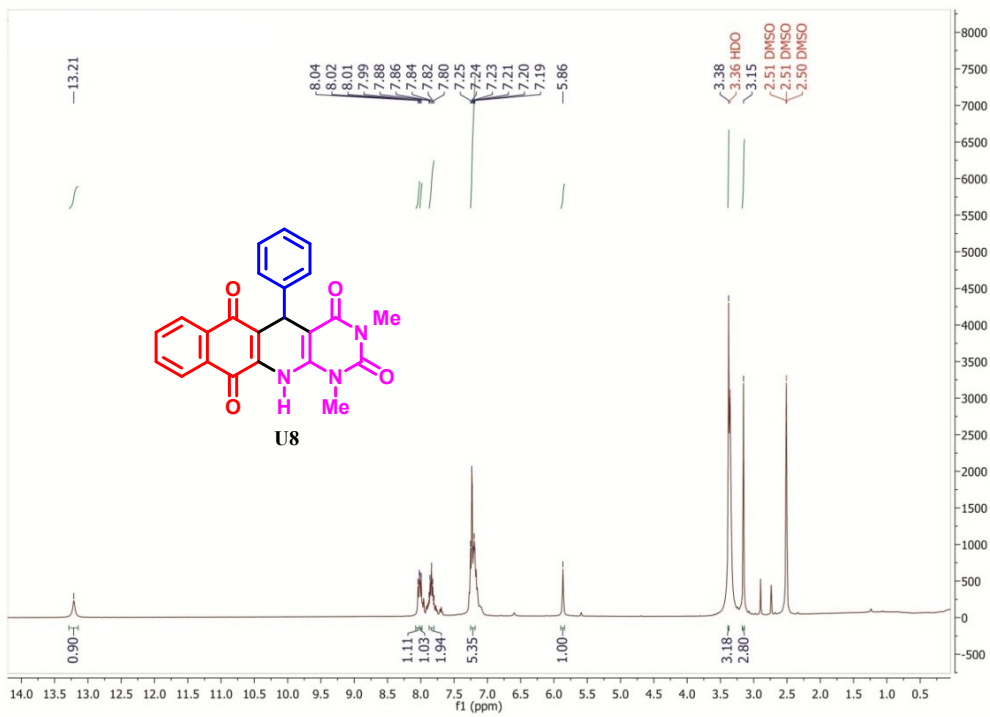
¹³C NMR spectrum of 5-(3-hydroxyphenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U7).



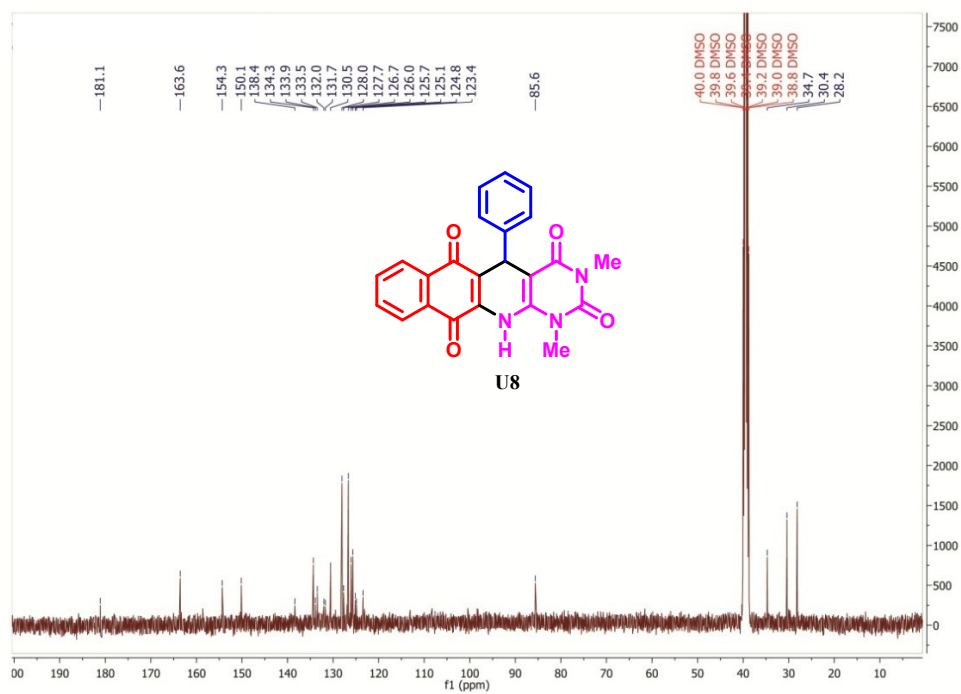
Mass spectrum of 5-(3-hydroxyphenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U7).



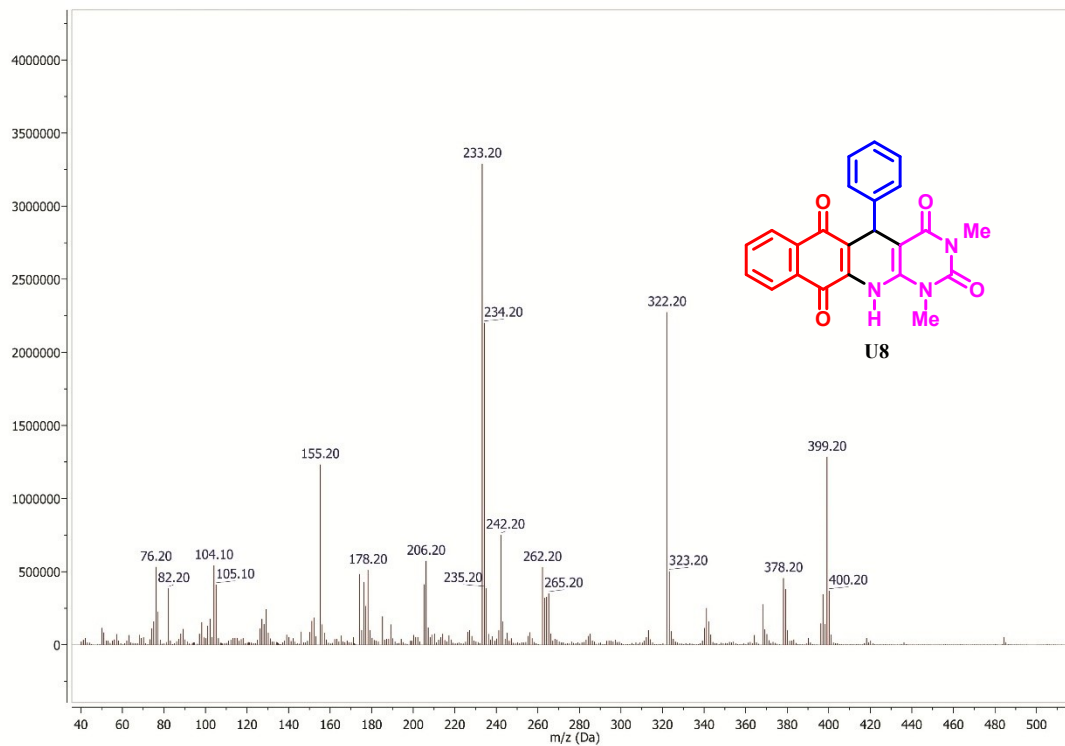
FT-IR spectrum of 1,3-dimethyl-5-phenyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U8).



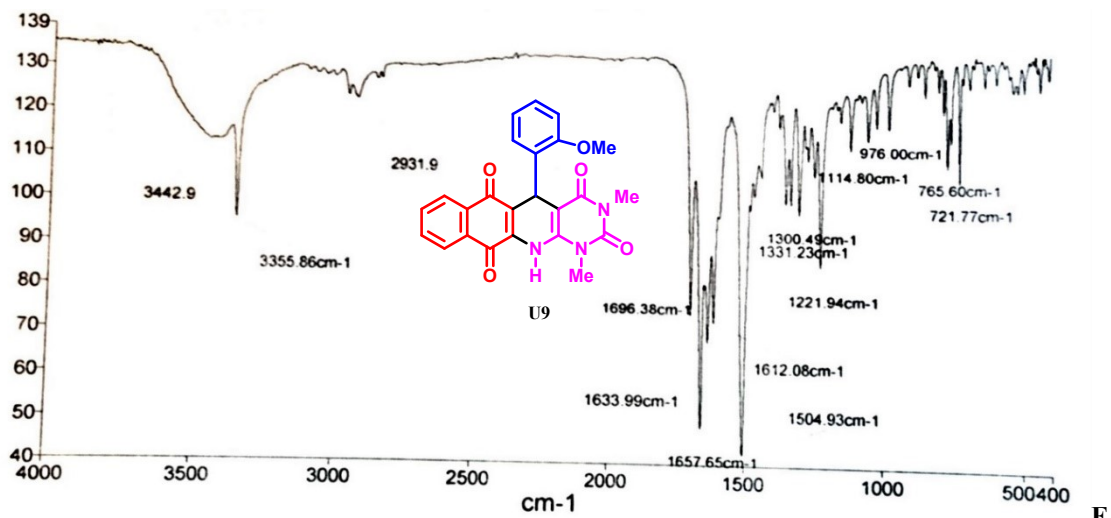
¹H NMR spectrum of 1,3-dimethyl-5-phenyl-5,12-dihydrobenzo[*g*]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U8).



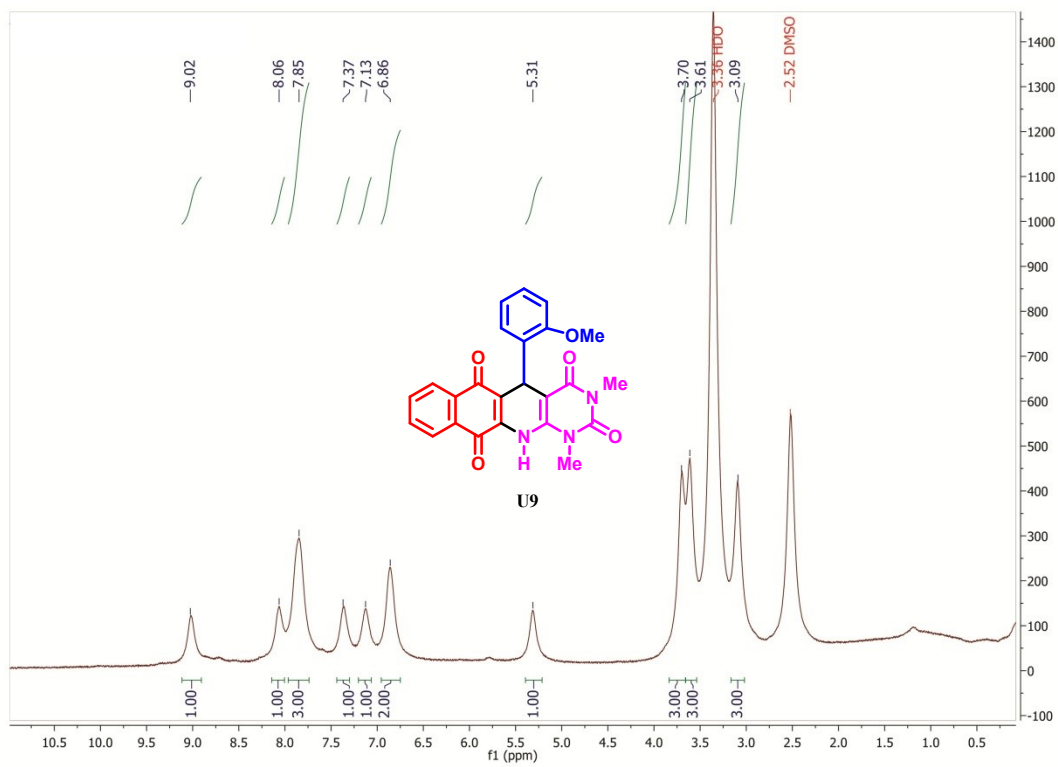
¹³C NMR spectrum of 1,3-dimethyl-5-phenyl-5,12-dihydrobenzo[*g*]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U8).



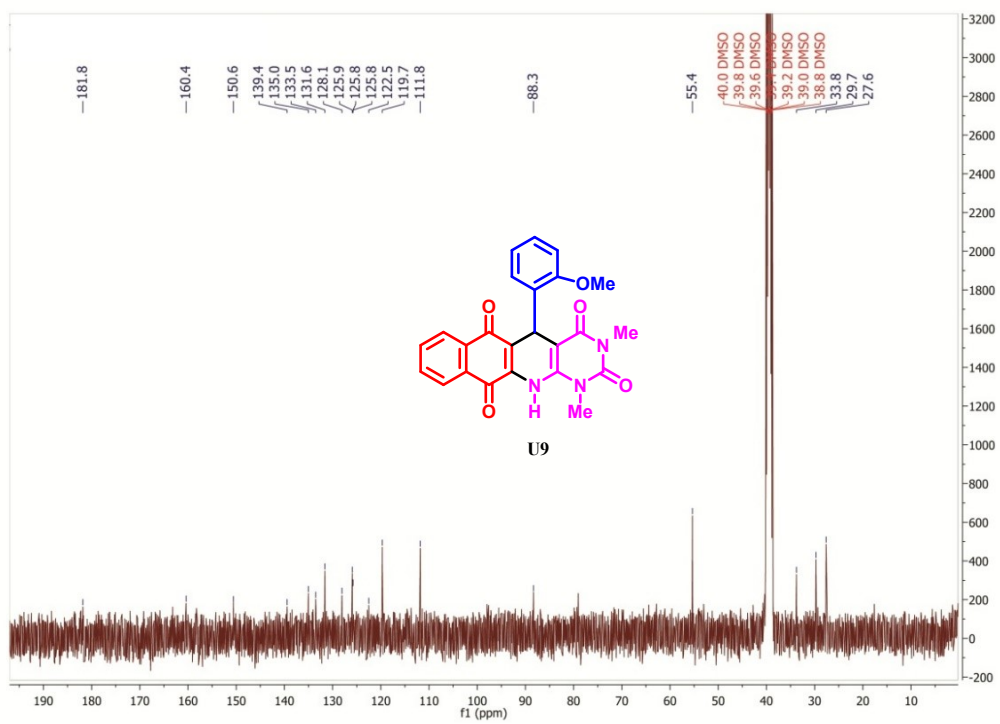
Mass spectrum of 1,3-dimethyl-5-phenyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U8).



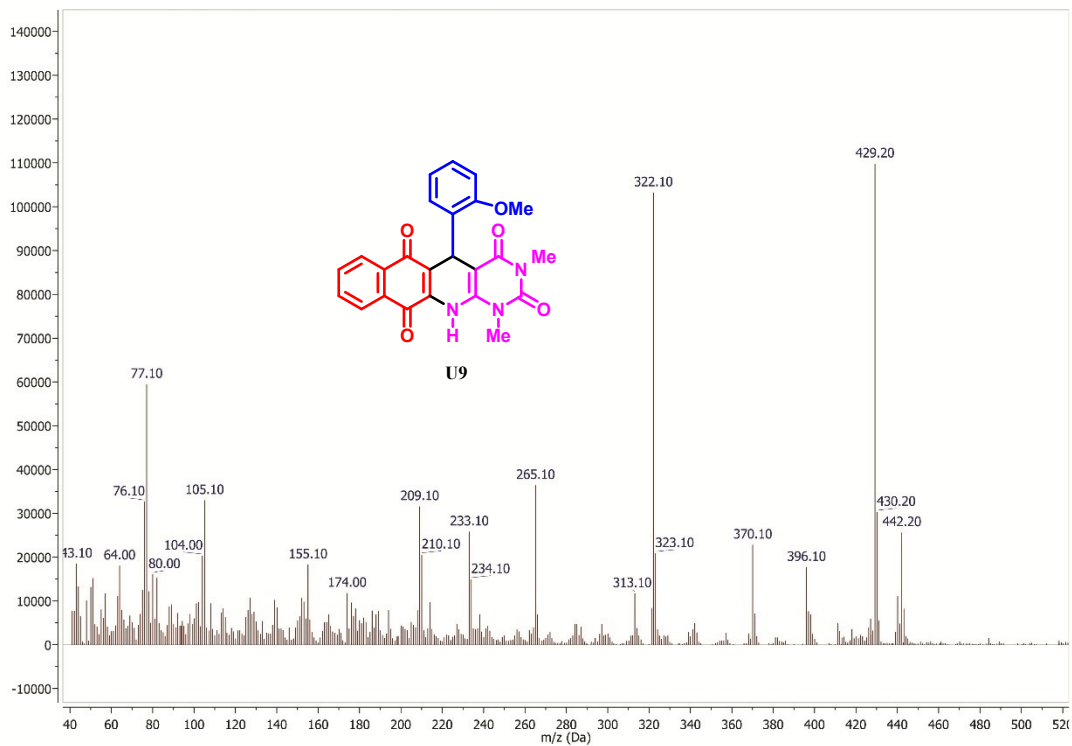
T-IR spectrum of 5-(2-methoxyphenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1H,3H)-tetraone (U9).



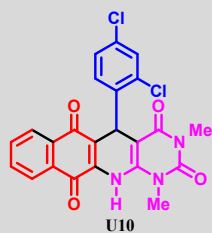
¹H NMR spectrum of 5-(2-methoxyphenyl)-1,3-dimethyl-5,12-dihydrobenzo[*g*]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U9).



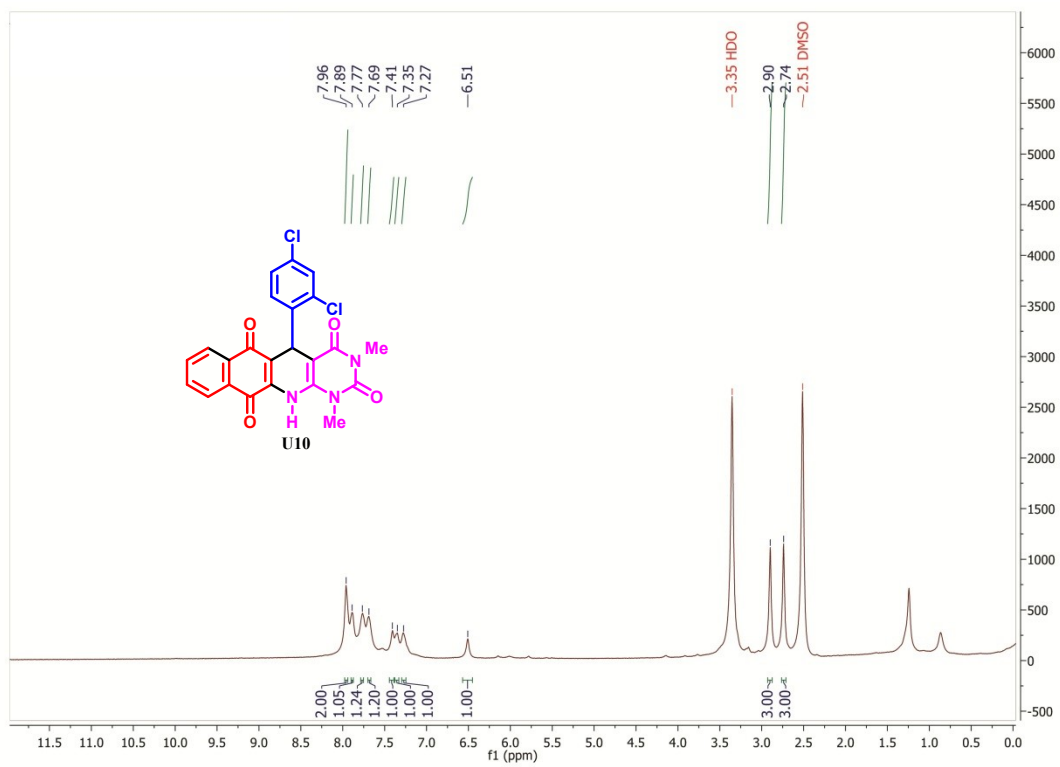
¹³C NMR spectrum of 5-(2-methoxyphenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U9).



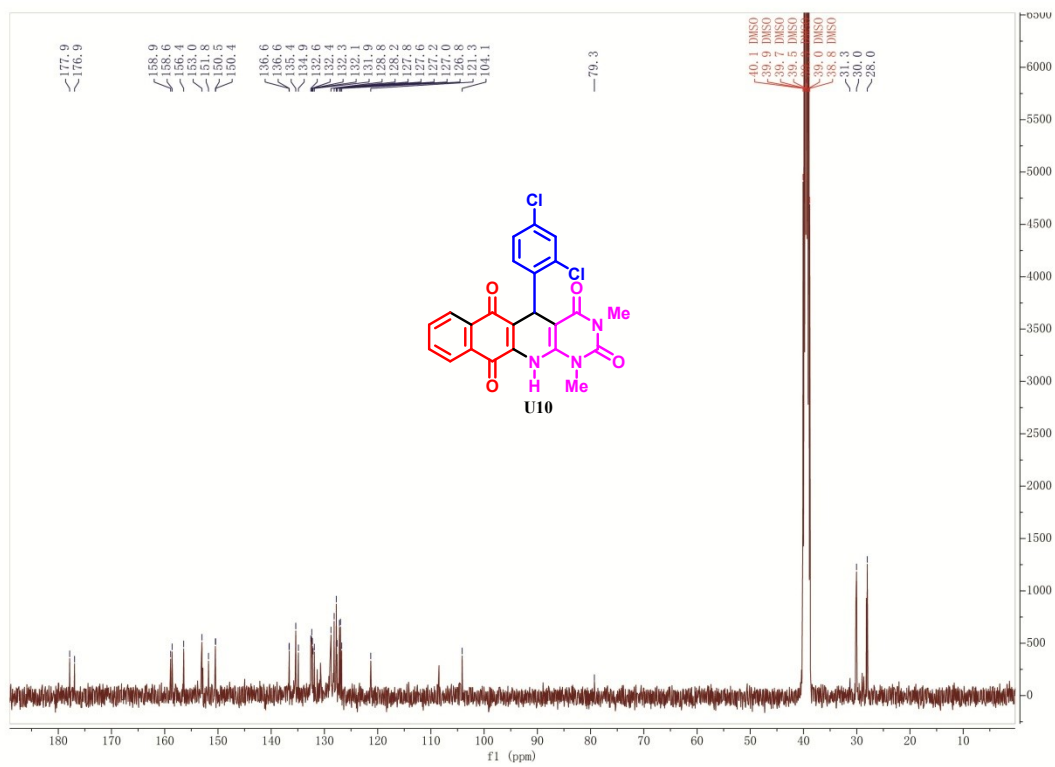
Mass spectrum of 5-(2-methoxyphenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U9).



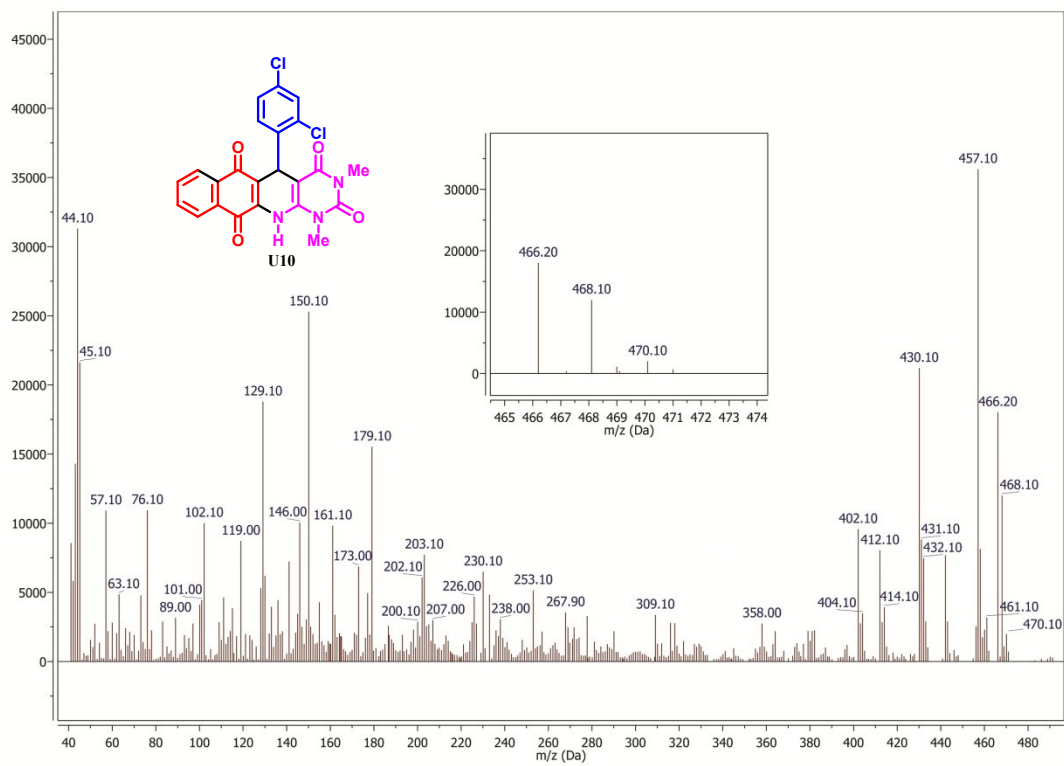
FT-IR spectrum of 5-(2,4-dichlorophenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U10).



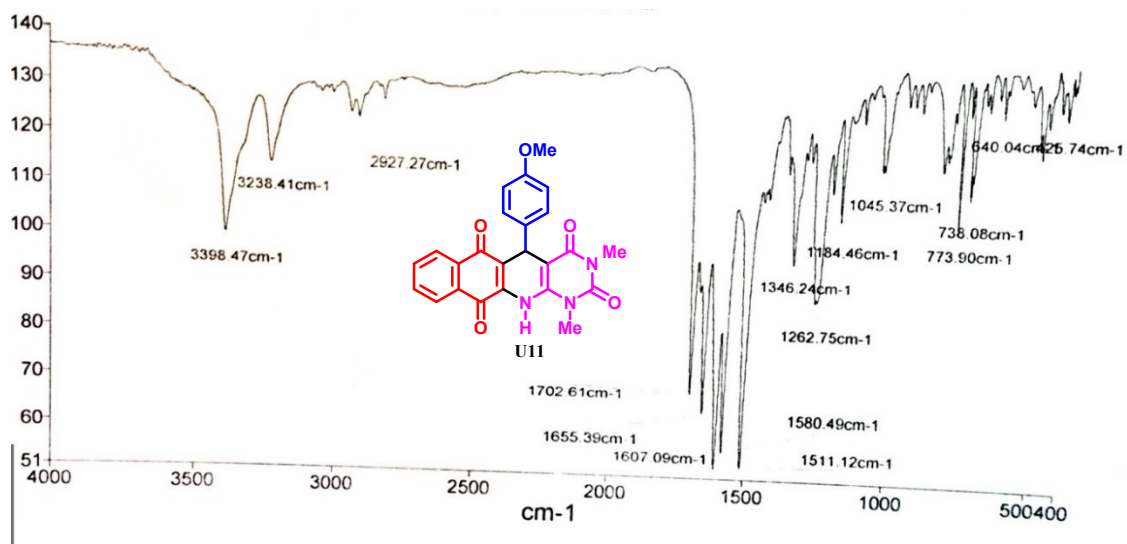
¹H NMR spectrum of 5-(2,4-dichlorophenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U10).



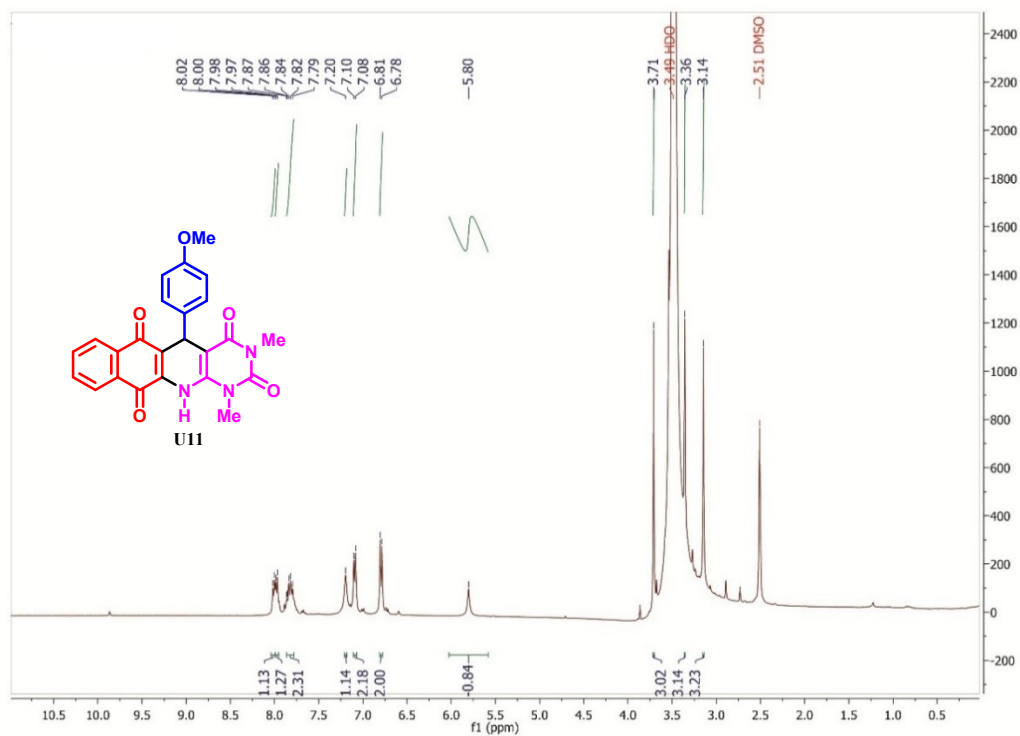
¹³C NMR spectrum of 5-(2,4-dichlorophenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U10).



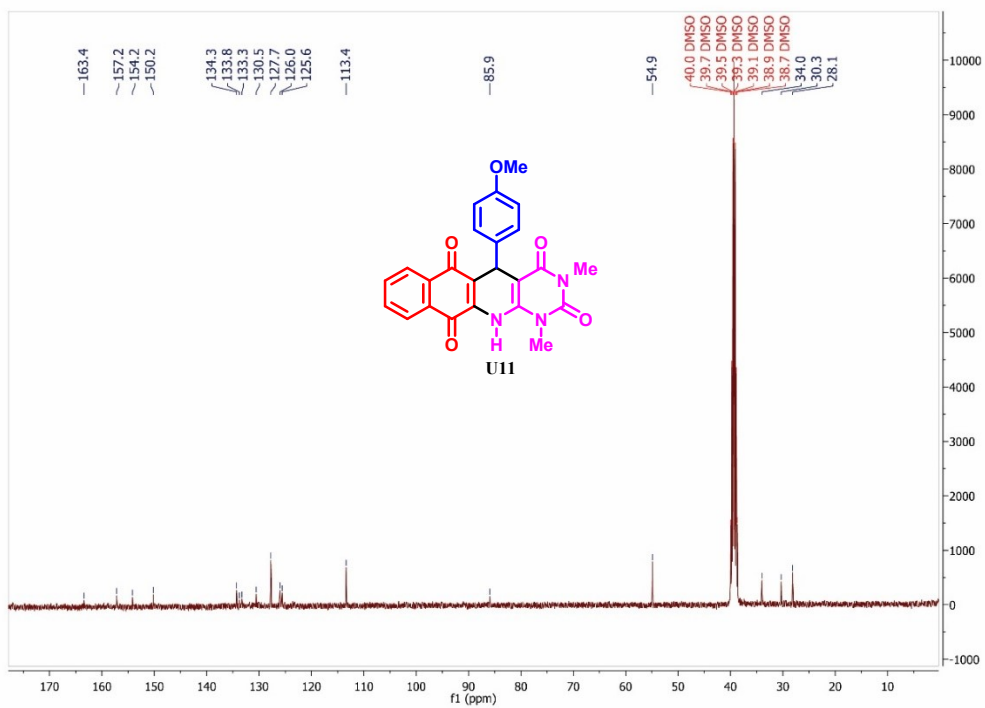
Mass spectrum of 5-(2,4-dichlorophenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U10).



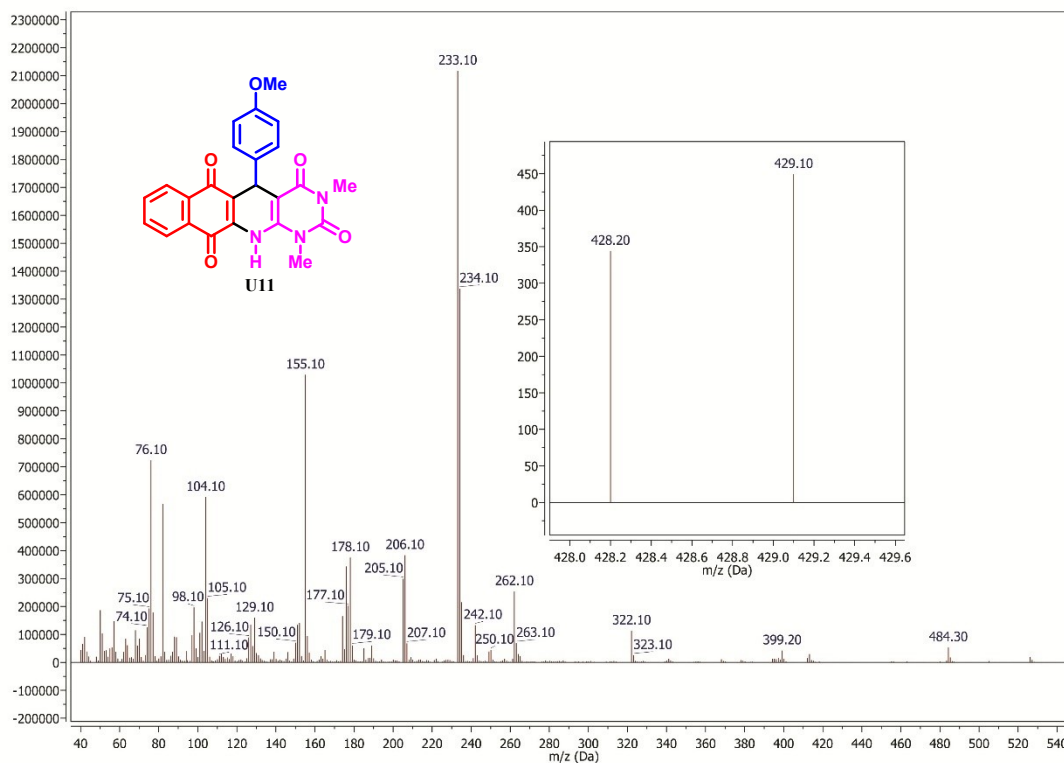
FT-IR spectrum of 5-(4-methoxyphenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U11).



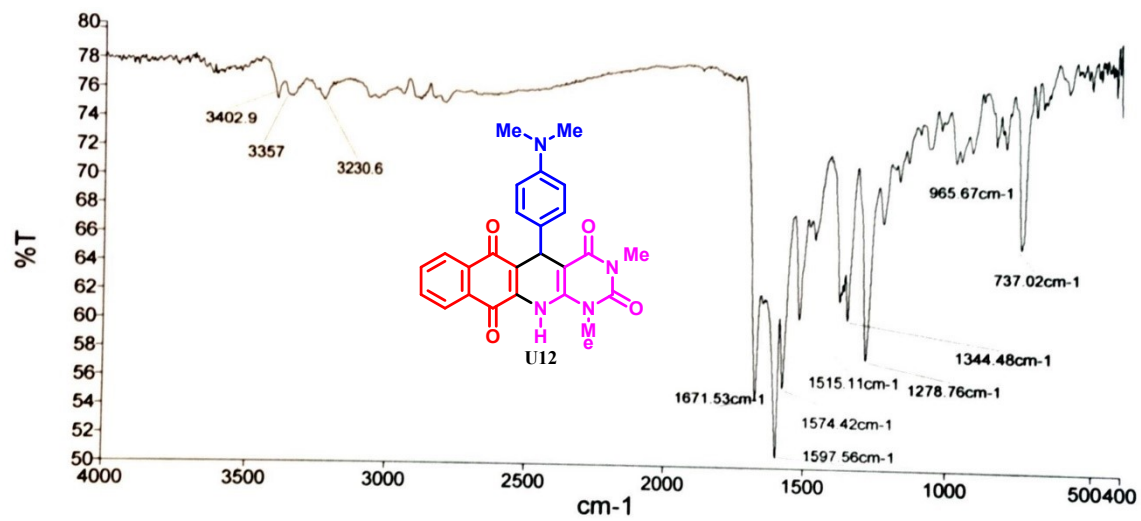
¹H NMR spectrum of 5-(4-methoxyphenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U11).



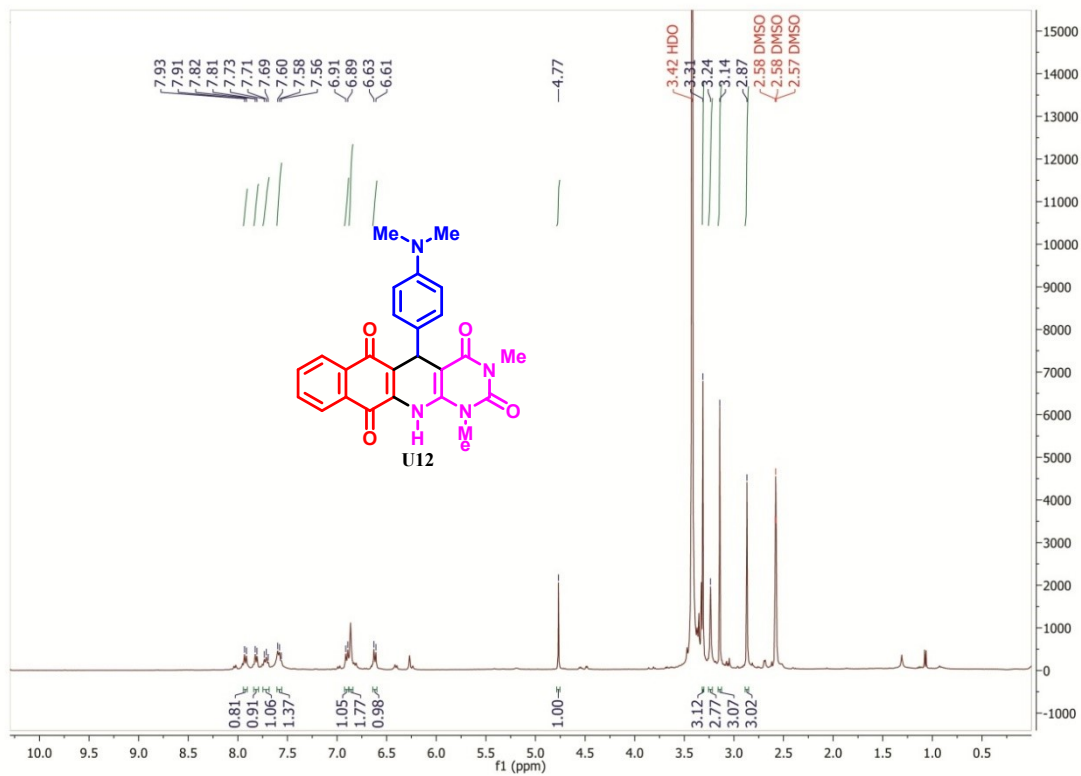
¹³C NMR spectrum of 5-(4-methoxyphenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U11).



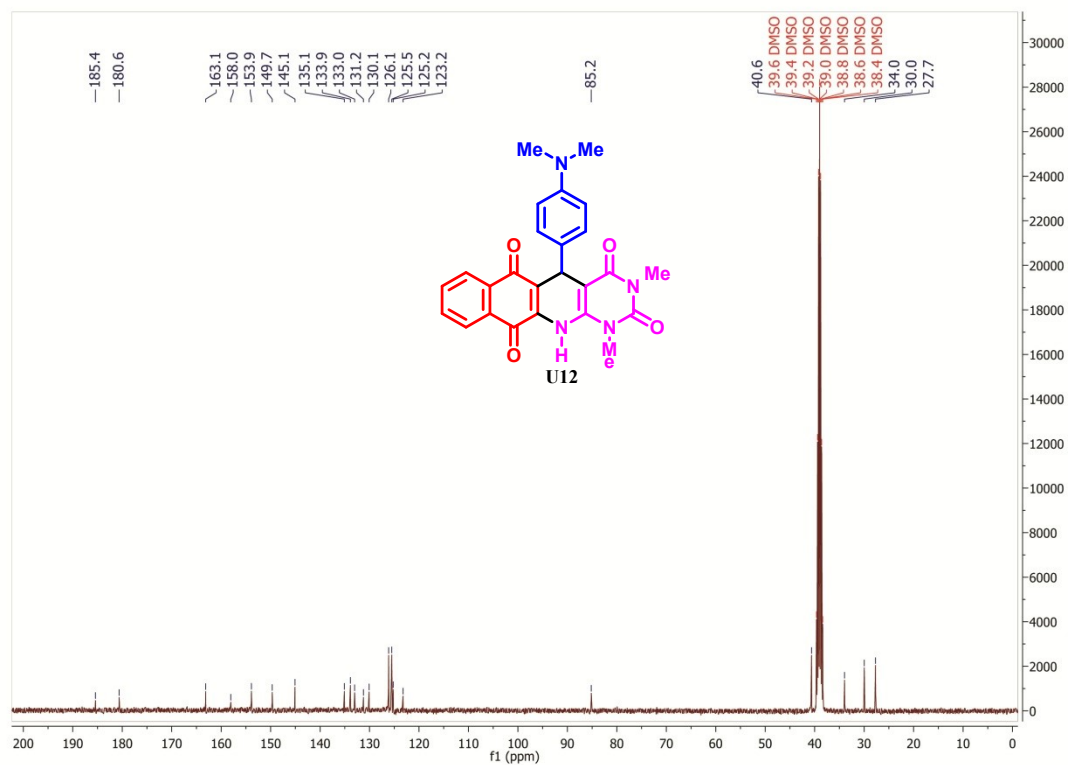
Mass spectrum of 5-(4-methoxyphenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U11).



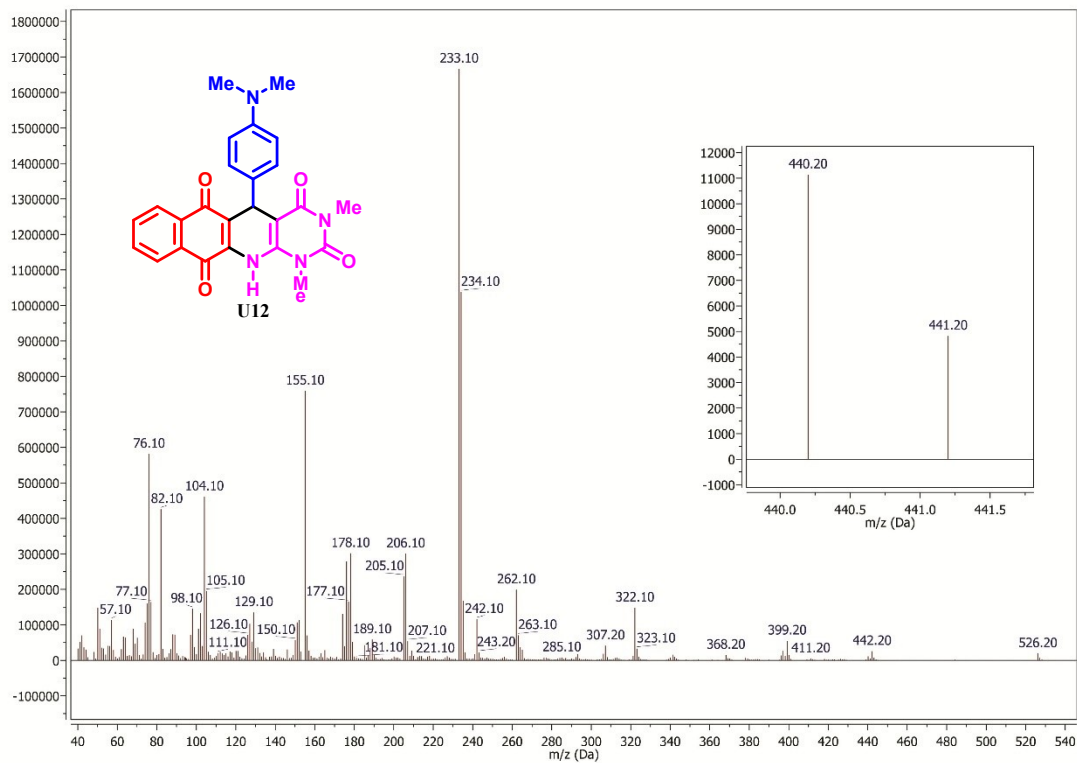
FT-IR spectrum of 5-(4-(dimethylamino)phenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U12).



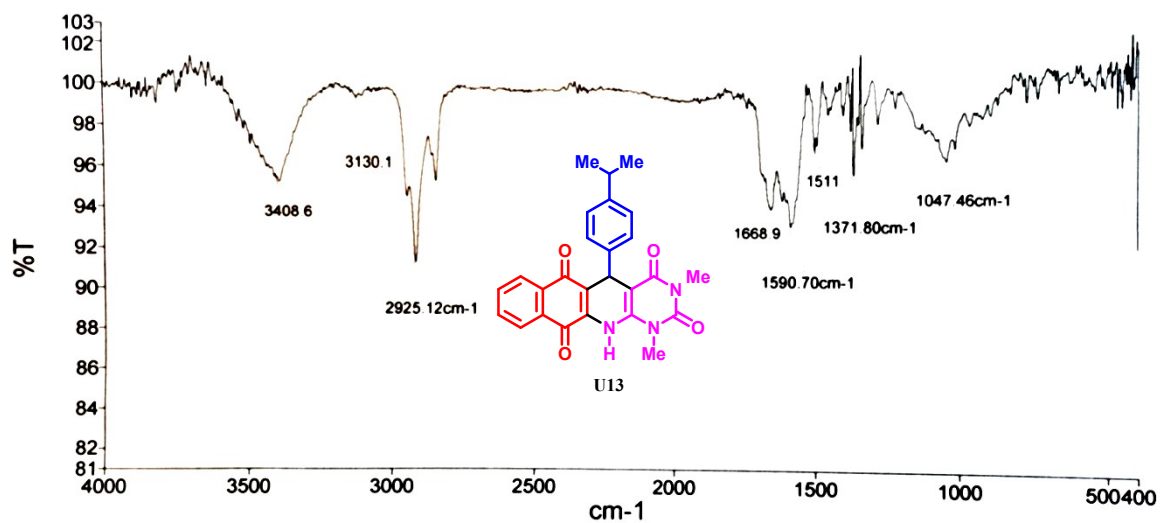
¹H NMR spectrum of 5-(4-(dimethylamino)phenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U12).



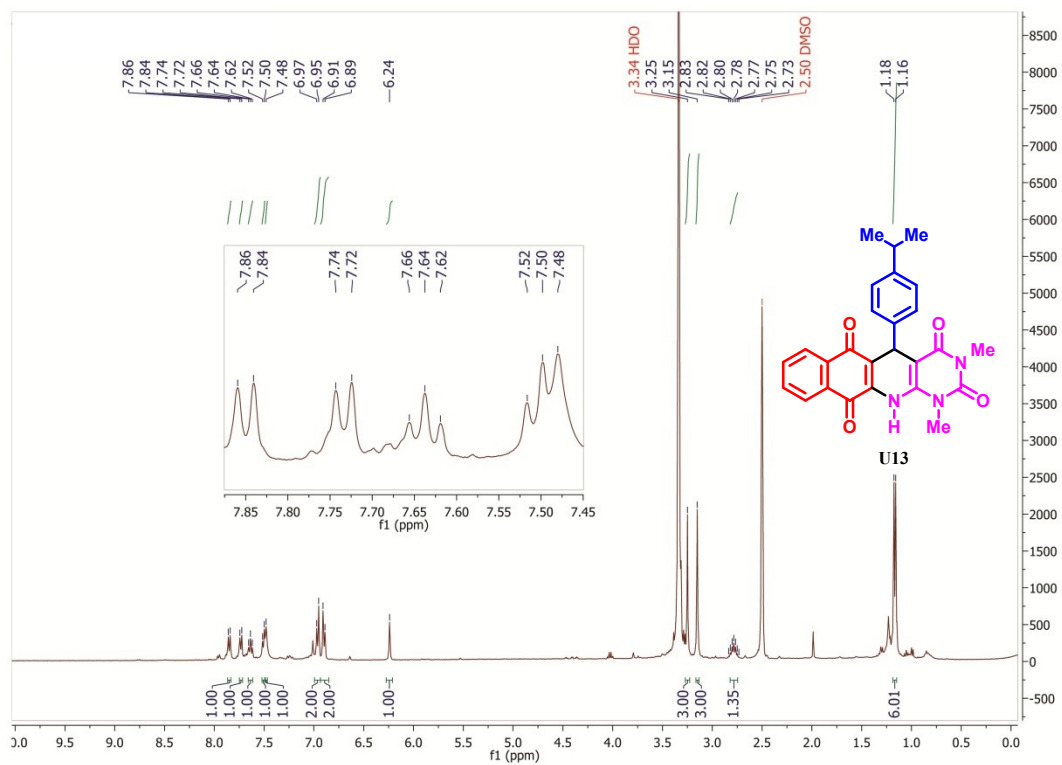
¹H NMR spectrum of 5-(4-(dimethylamino)phenyl)-1,3-dimethyl-5,12-dihydrobenzo[*g*]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U12).



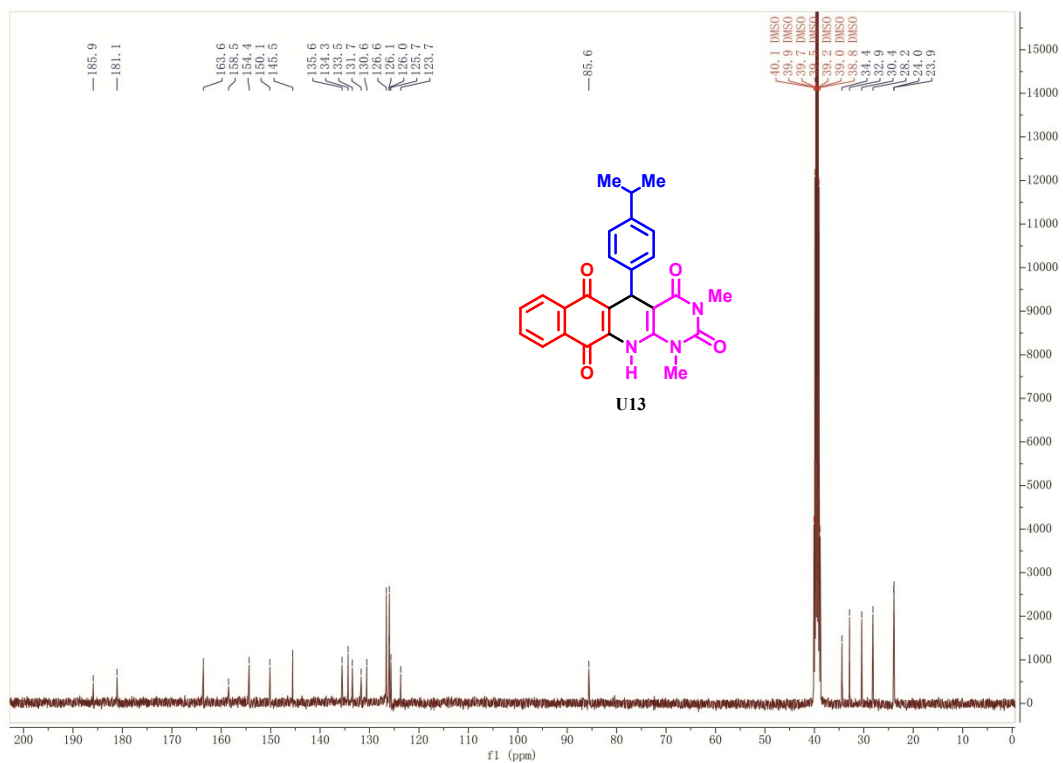
Mass spectrum of 5-(4-(dimethylamino)phenyl)-1,3-dimethyl-5,12-dihydrobenzo[*g*]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U12).



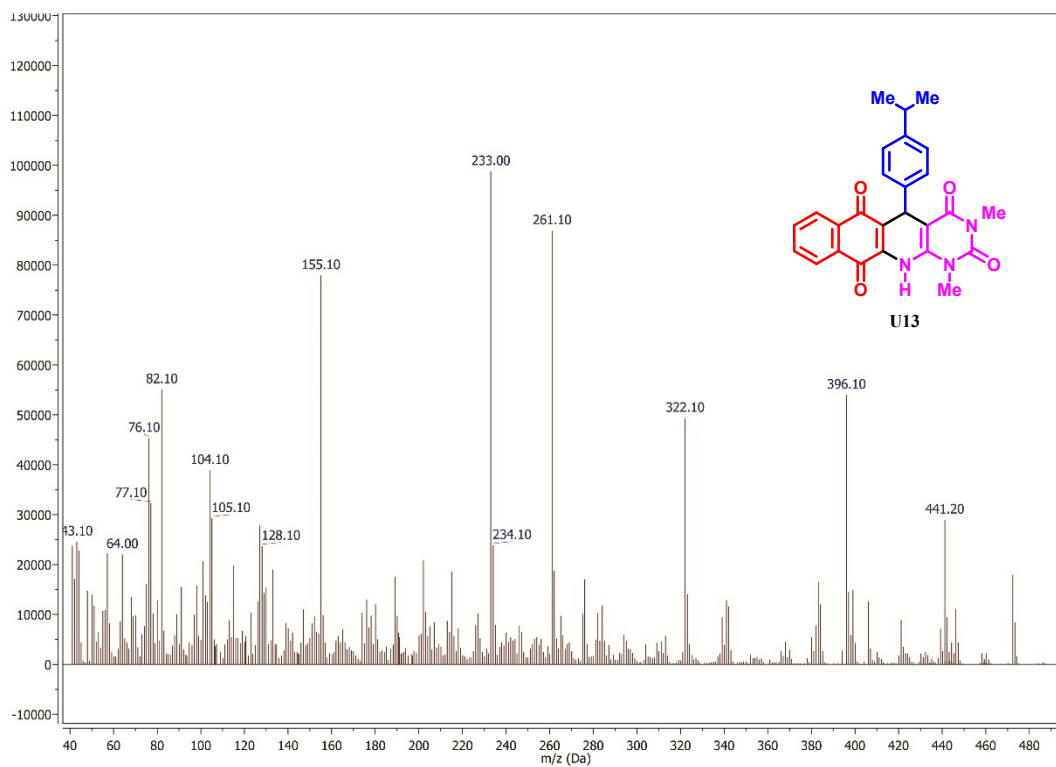
FT-IR spectrum of 5-(4-isopropylphenyl)-1,3-dimethyl-5,12-dihydrobenzo[*g*]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U13).



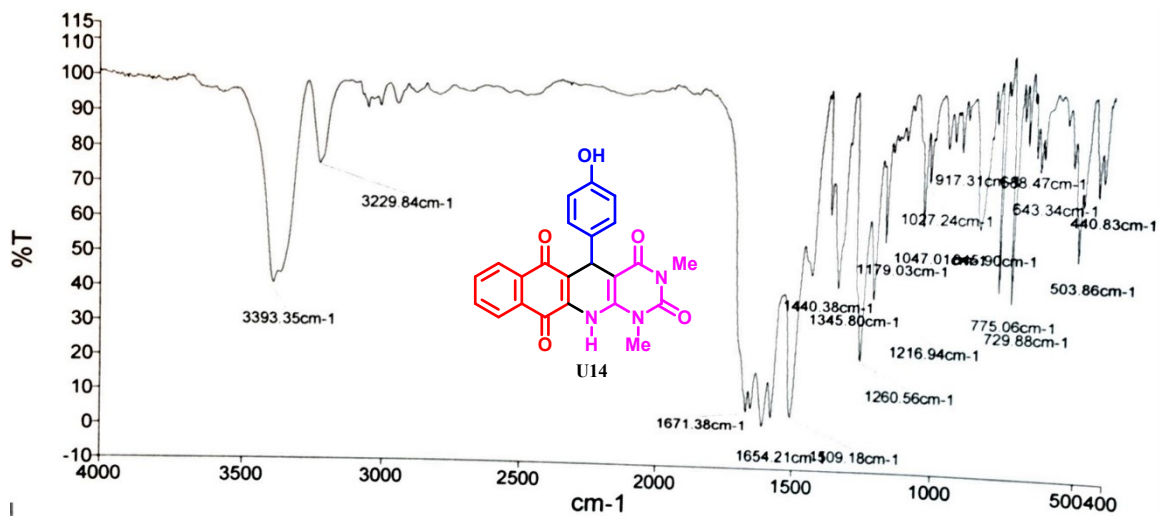
¹H NMR spectrum of 5-(4-isopropylphenyl)-1,3-dimethyl-5,12-dihydrobenzo[*g*]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U13).



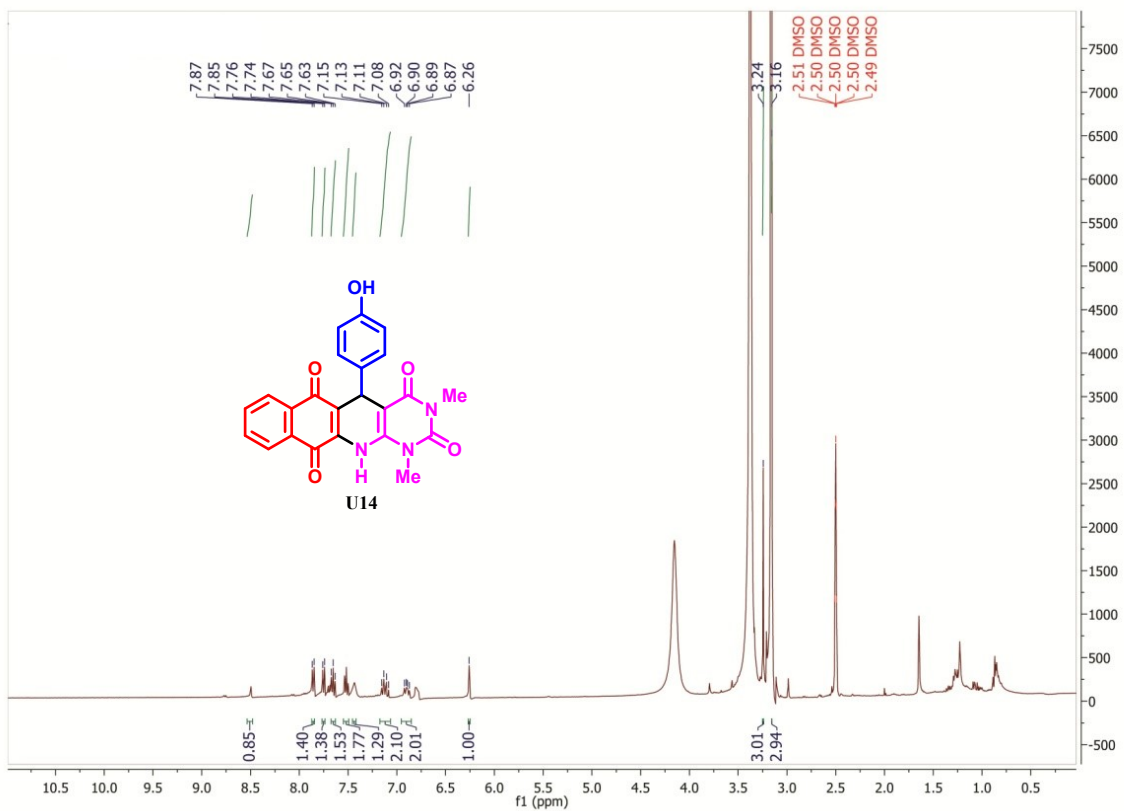
¹³C NMR spectrum of 5-(4-isopropylphenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U13).



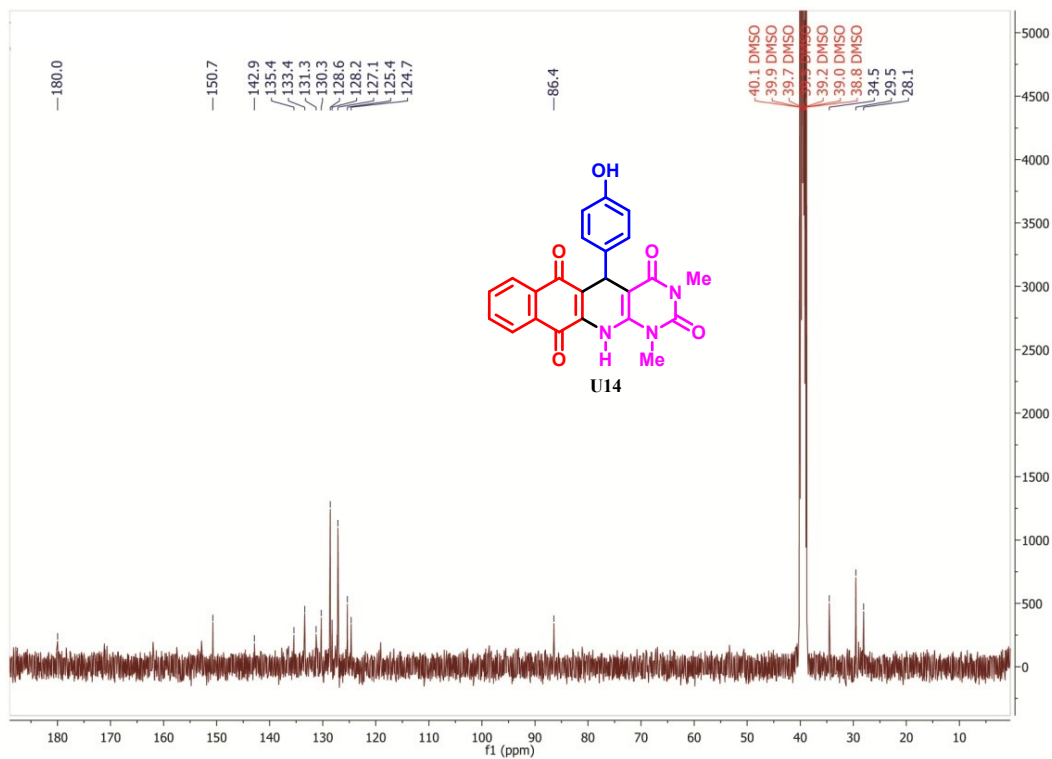
Mass spectrum of 5-(4-isopropylphenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U13).



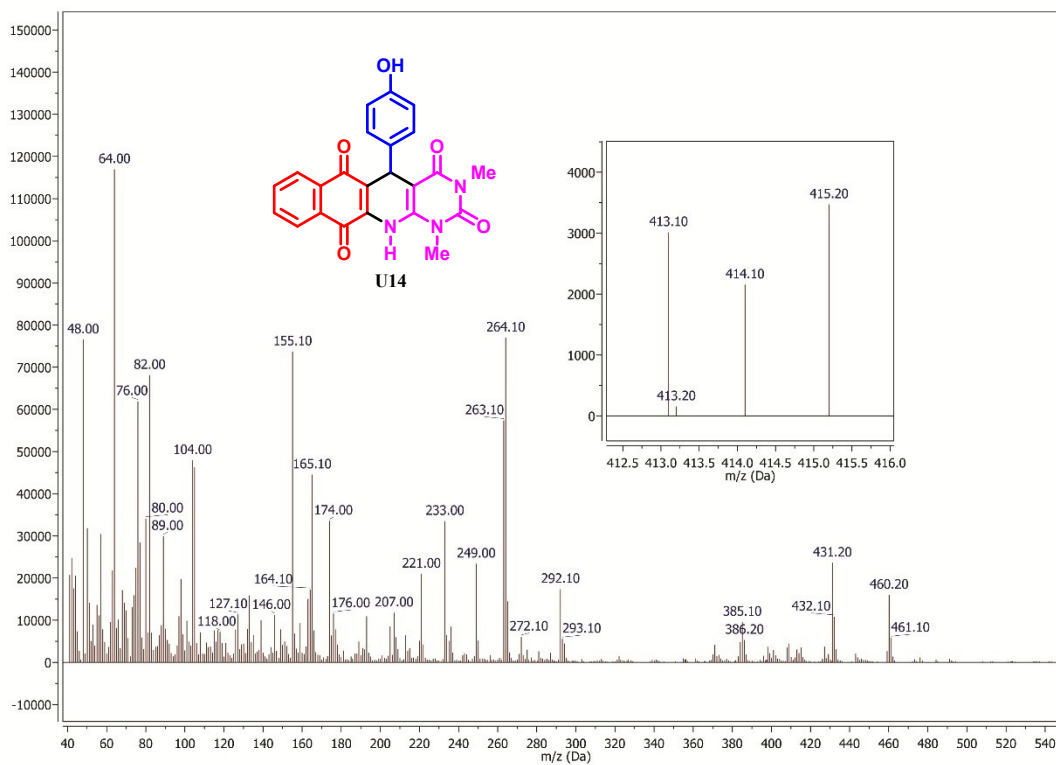
FT-IR spectrum of 5-(4-hydroxyphenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U14).



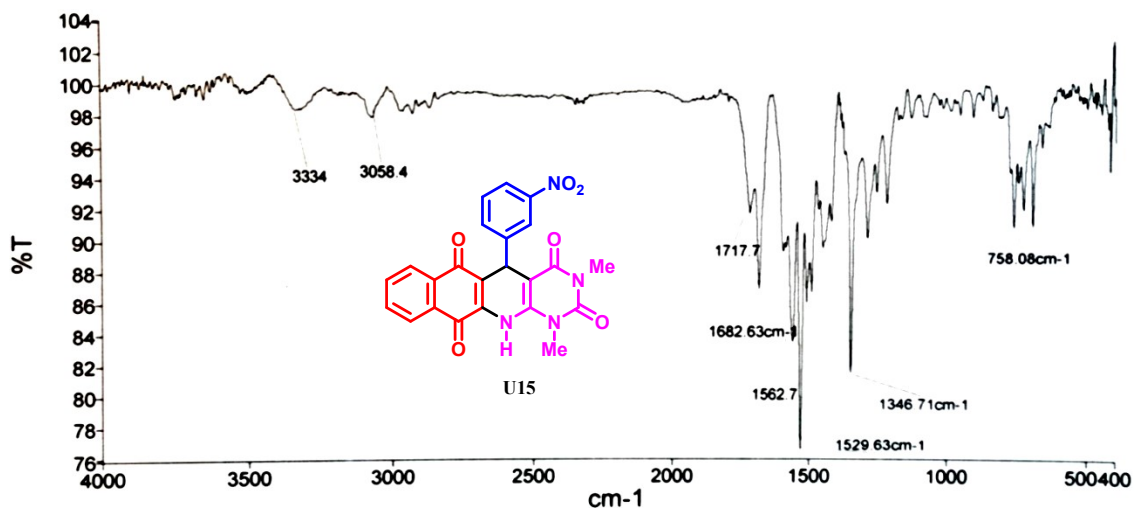
¹H NMR spectrum of 5-(4-hydroxyphenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U14).



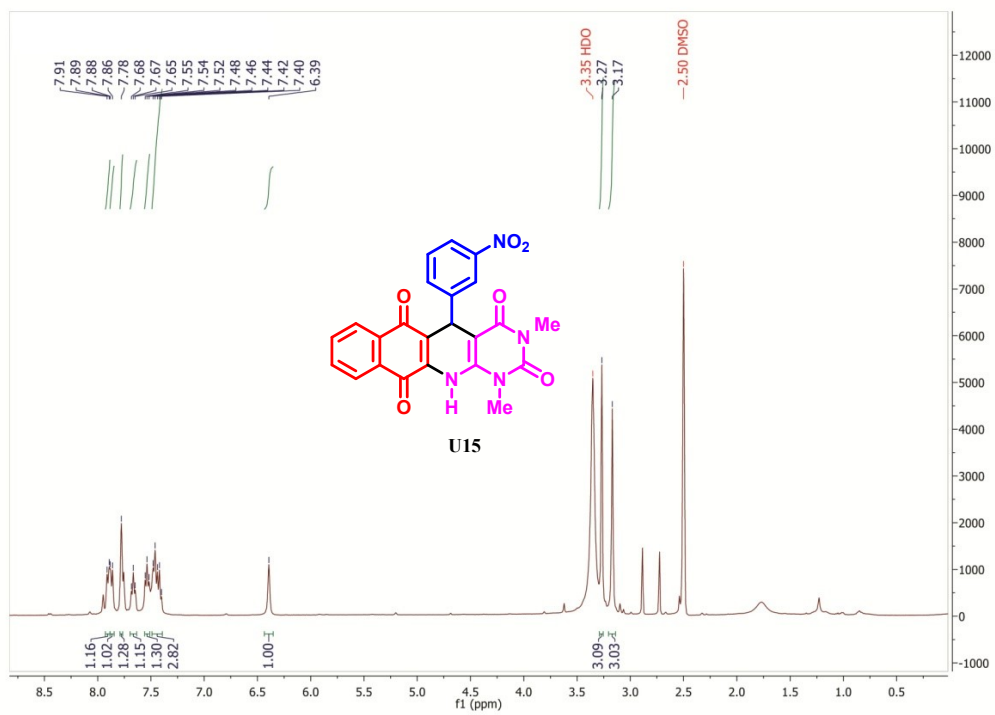
¹³C NMR spectrum of 5-(4-hydroxyphenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U14).

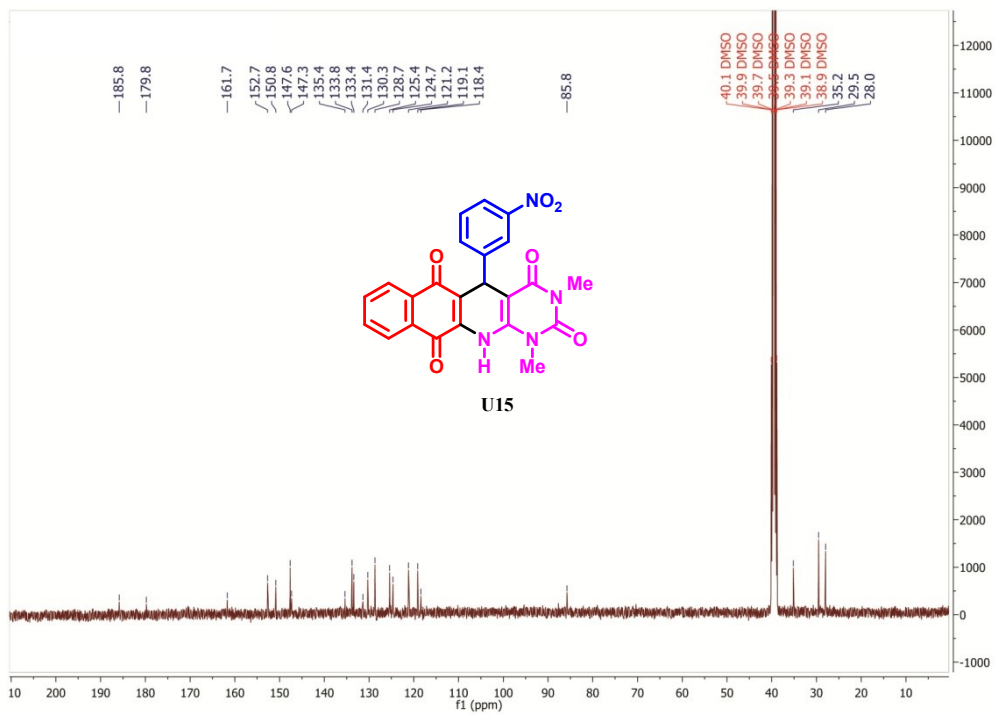


Mass spectrum of 5-(4-hydroxyphenyl)-1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U14).

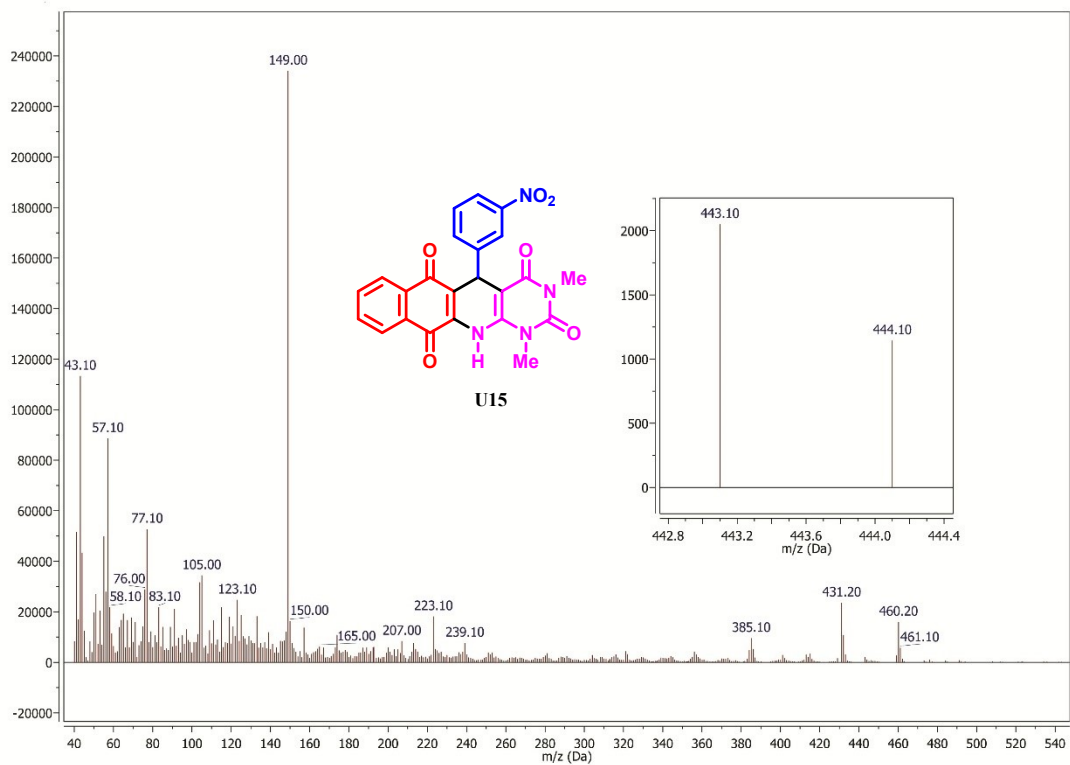


FT-IR spectrum of 1,3-dimethyl-5-(3-nitrophenyl)-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U15).

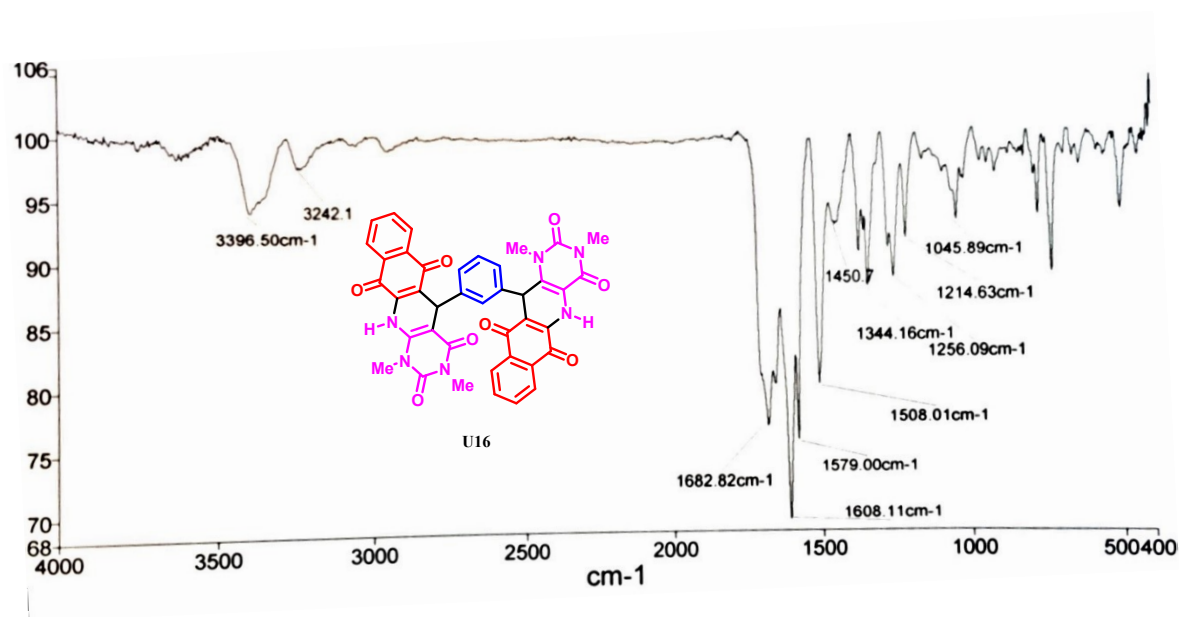




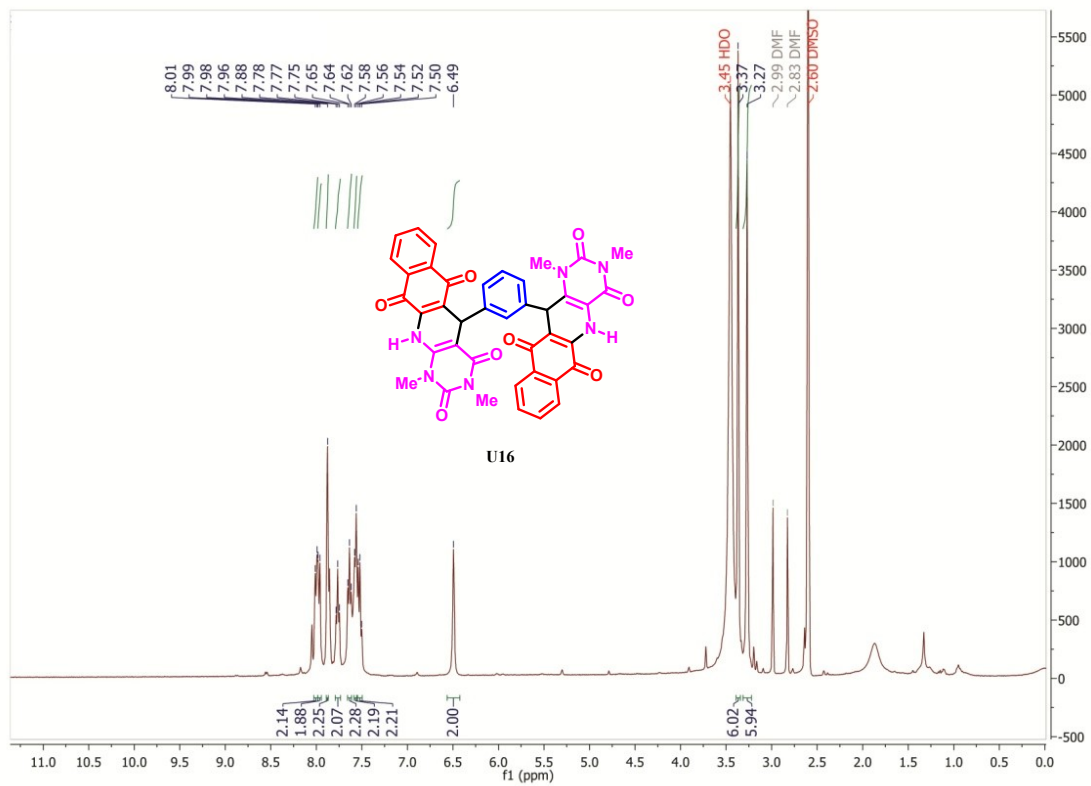
¹³C NMR spectrum of 1,3-dimethyl-5-(3-nitrophenyl)-5,12-dihydrobenzo[*g*]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U15).

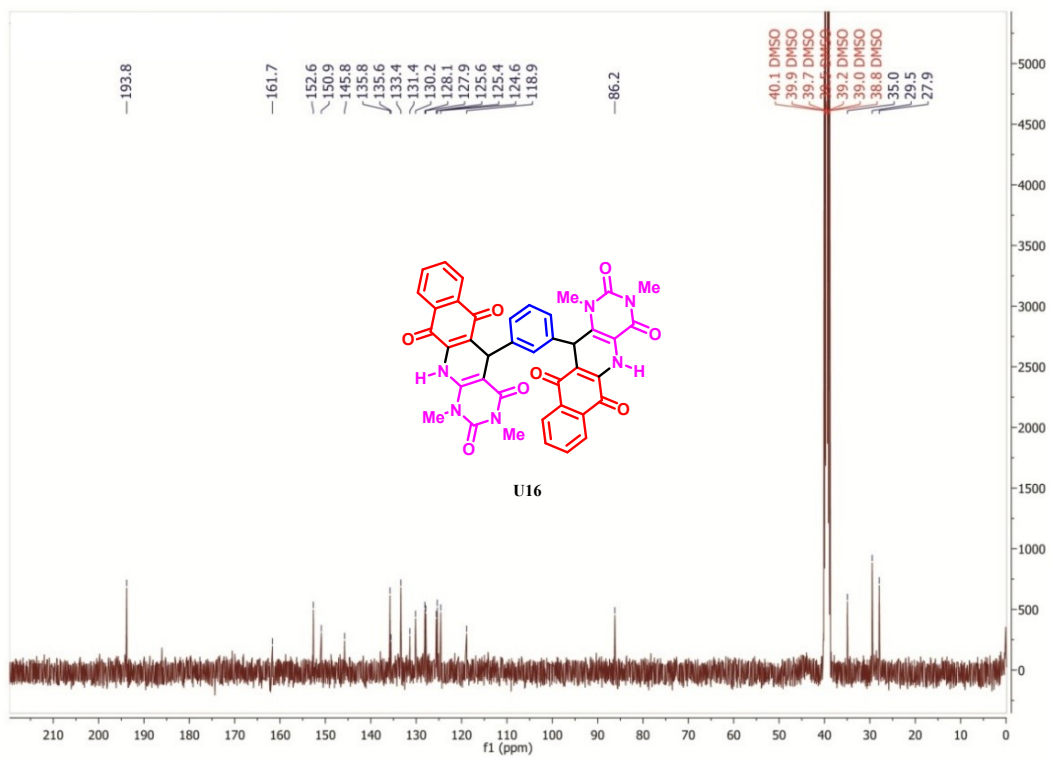


Mass spectrum of 1,3-dimethyl-5-(3-nitrophenyl)-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone (U15).

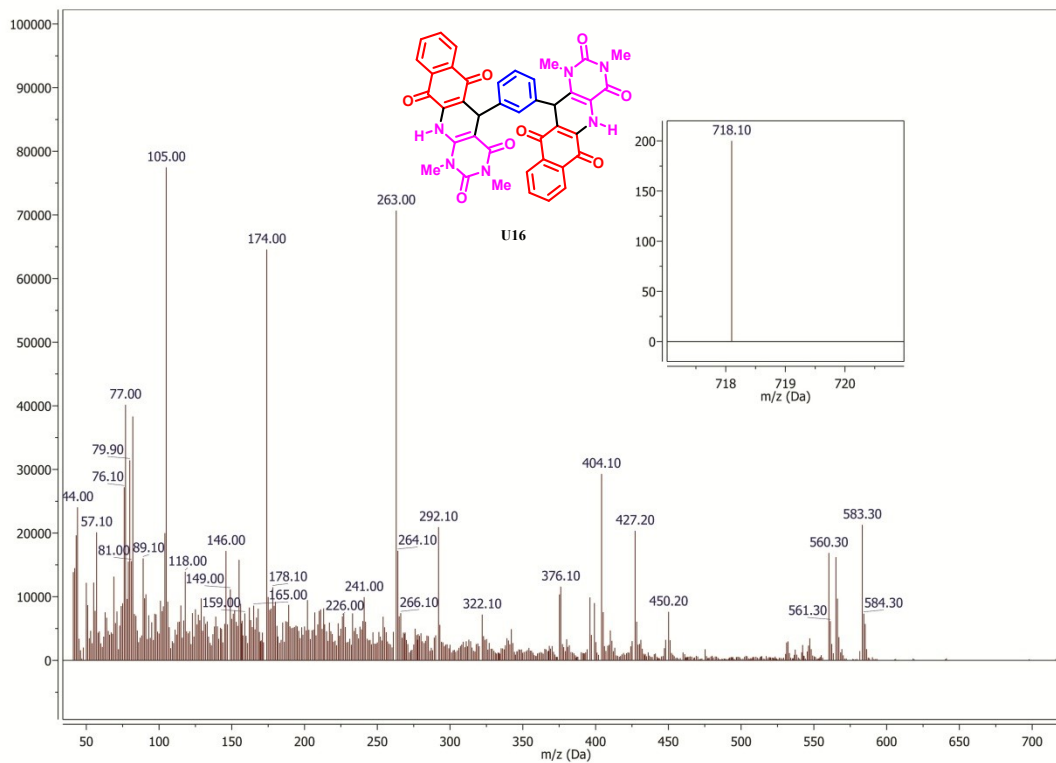


FT-IR spectrum of 5,5'-(1,3-phenylene)bis(1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone) (U16).

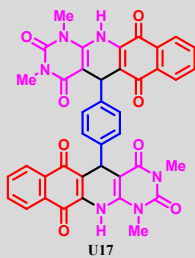




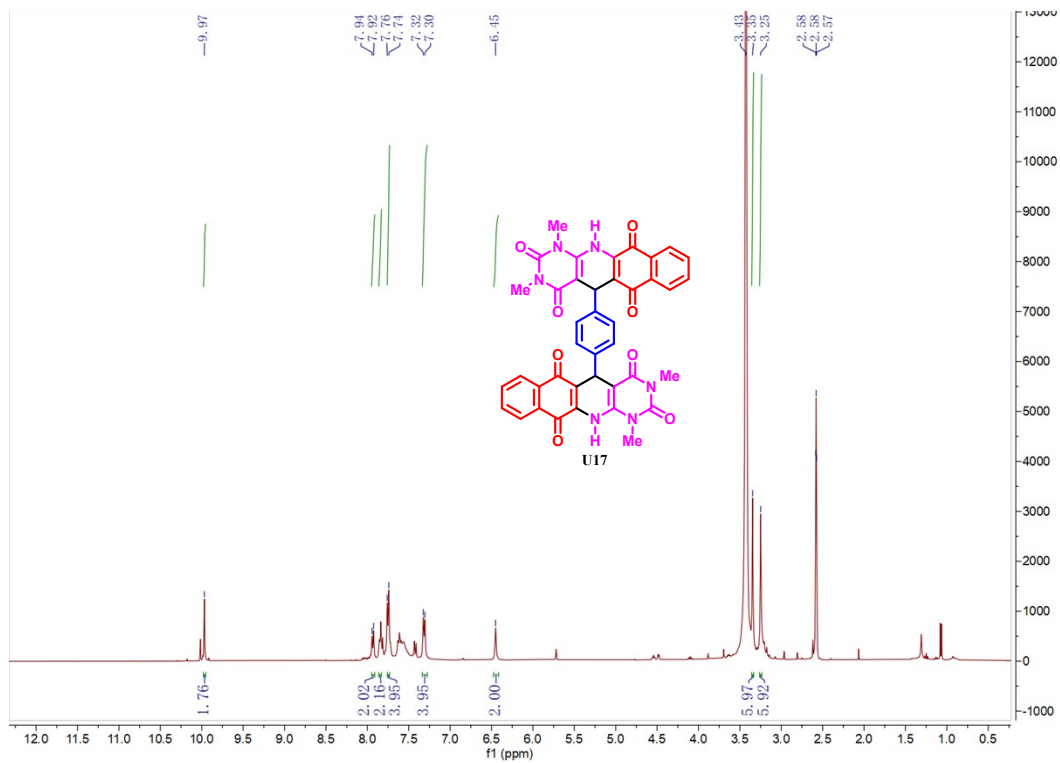
¹³C NMR spectrum of 5,5'-(1,3-phenylene)bis(1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1H,3H)-tetraone) (U16).



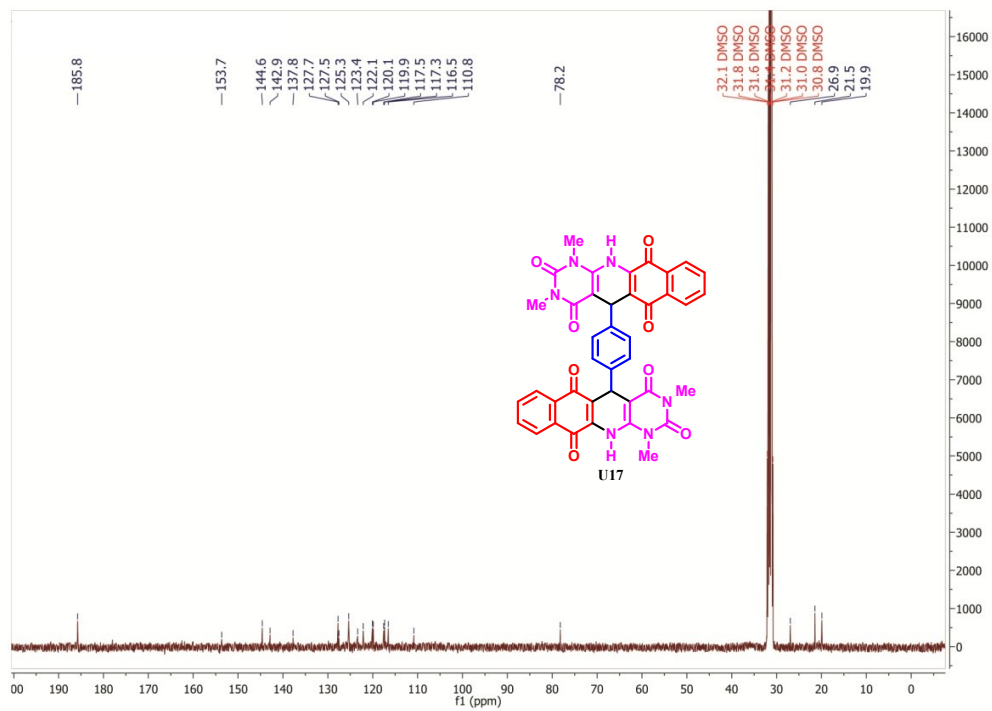
Mass spectrum of 5,5'-(1,3-phenylene)bis(1,3-dimethyl-5,12-dihydrobenzo[*g*]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone) (U16).



FT-IR spectrum of 5,5'-(1,4-phenylene)bis(1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1H,3H)-tetraone) (U17).

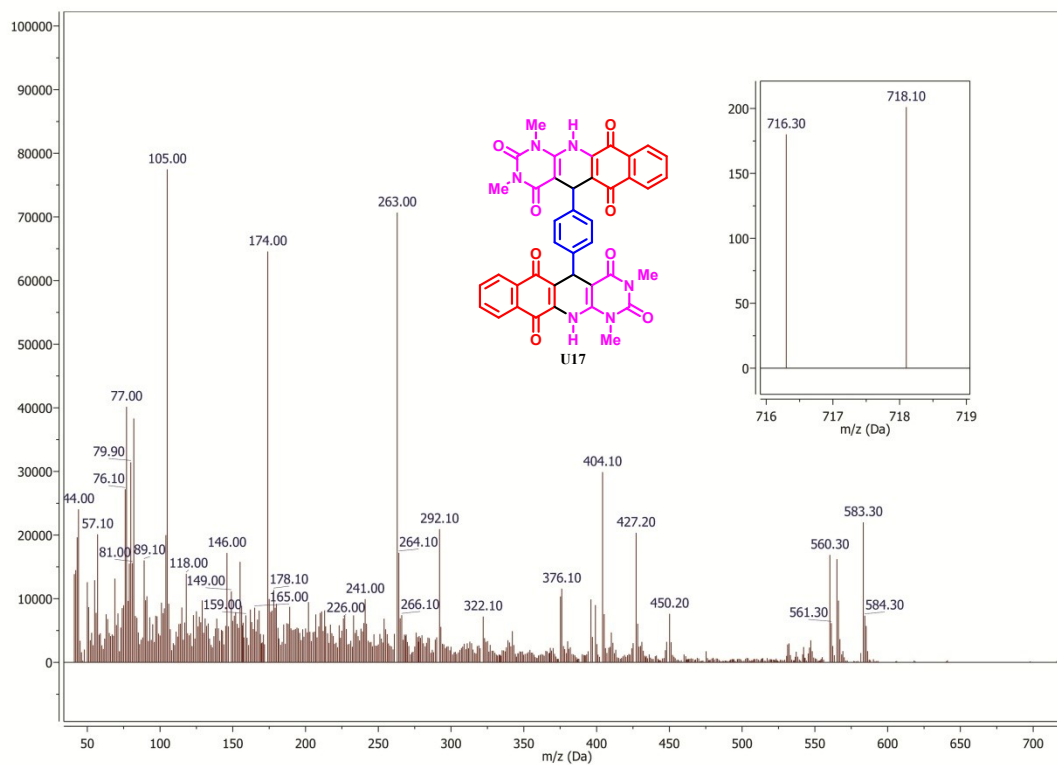


¹H NMR spectrum of 5,5'-(1,4-phenylene)bis(1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone) (U17).



¹³C

NMR spectrum of 5,5'-(1,4-phenylene)bis(1,3-dimethyl-5,12-dihydrobenzo[*g*]pyrimido[4,5-*b*]quinoline-2,4,6,11(1*H*,3*H*)-tetraone) (U17).



Mass spectrum of 5,5'-(1,4-phenylene)bis(1,3-dimethyl-5,12-dihydrobenzo[g]pyrimido[4,5-b]quinoline-2,4,6,11(1*H*,3*H*)-tetraone) (U17).