

Catalytic application of a bimetallic–organic framework with phosphorus acid groups in the preparation of pyrido[2,3-*d*]pyrimidines *via* cooperative vinylogous anomeric-based oxidation

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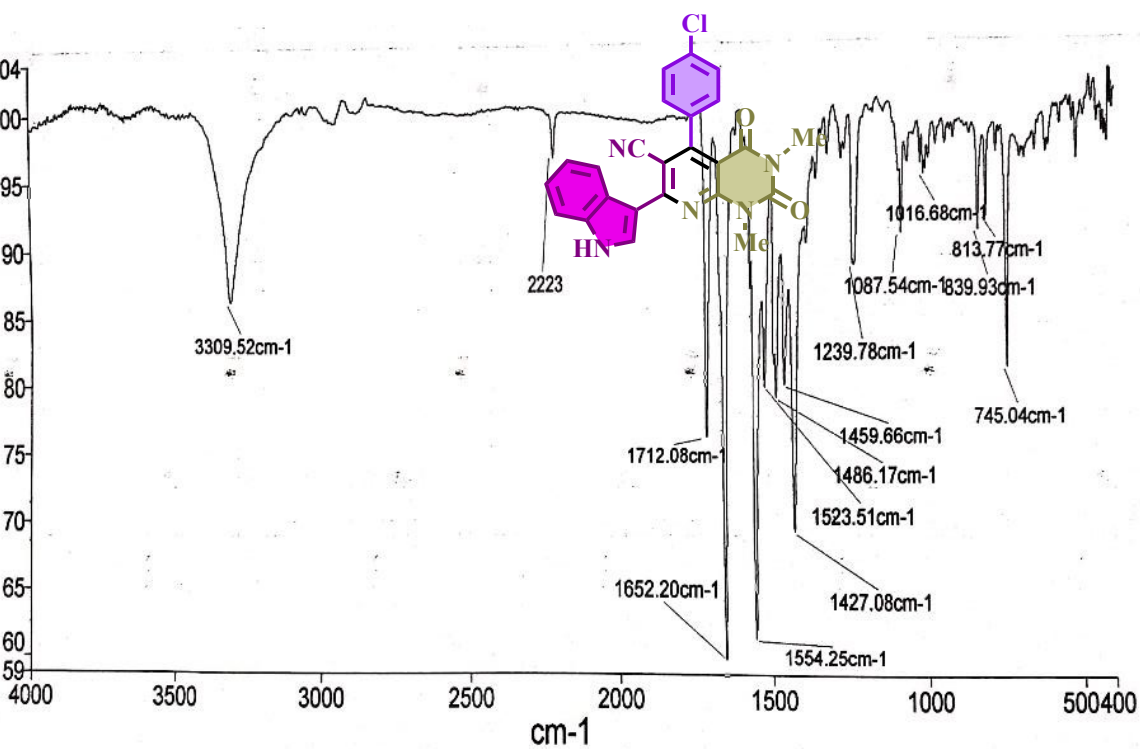
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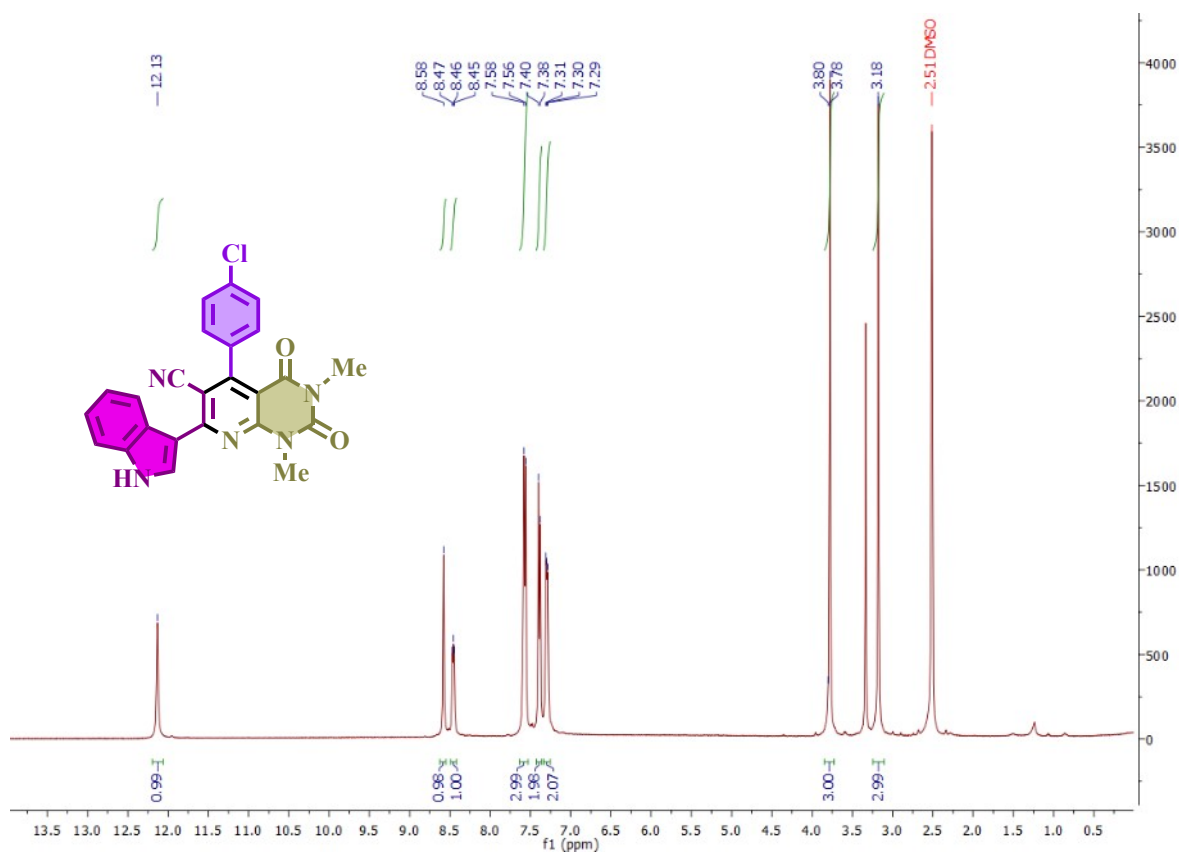
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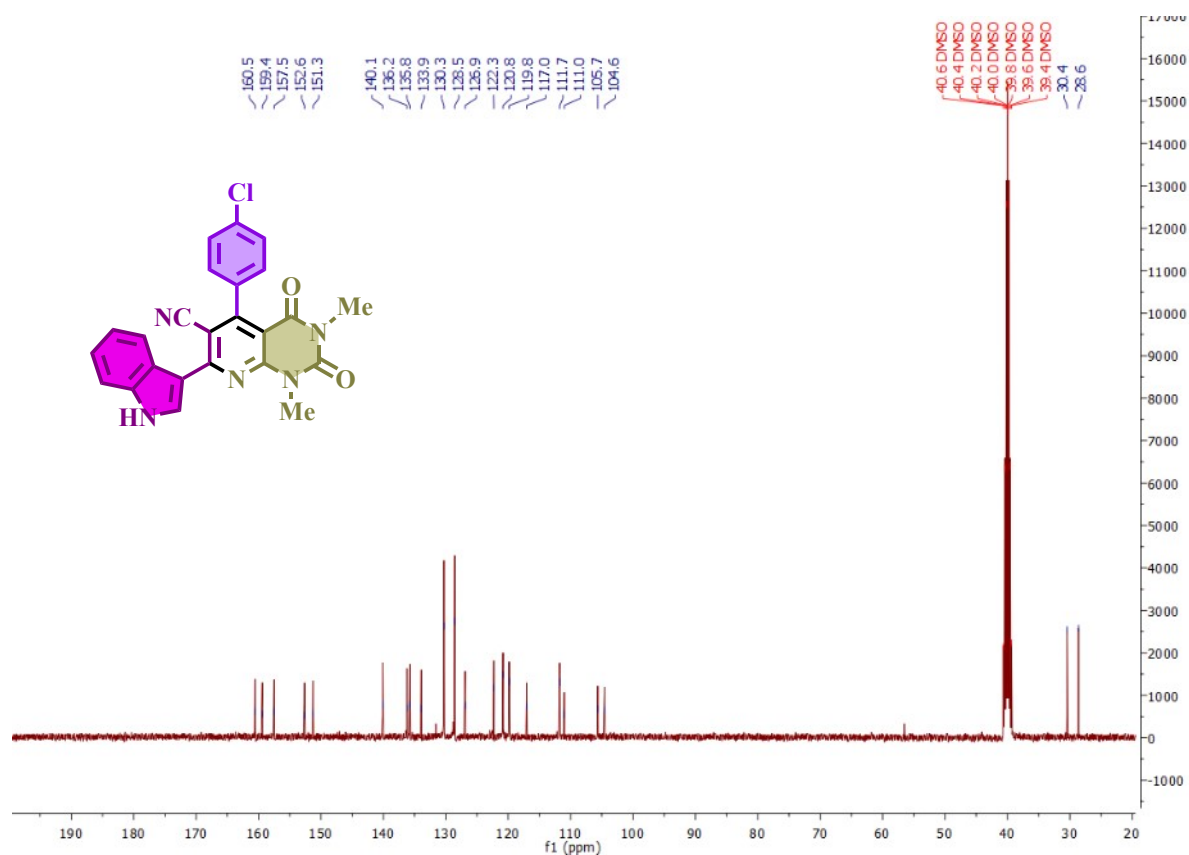
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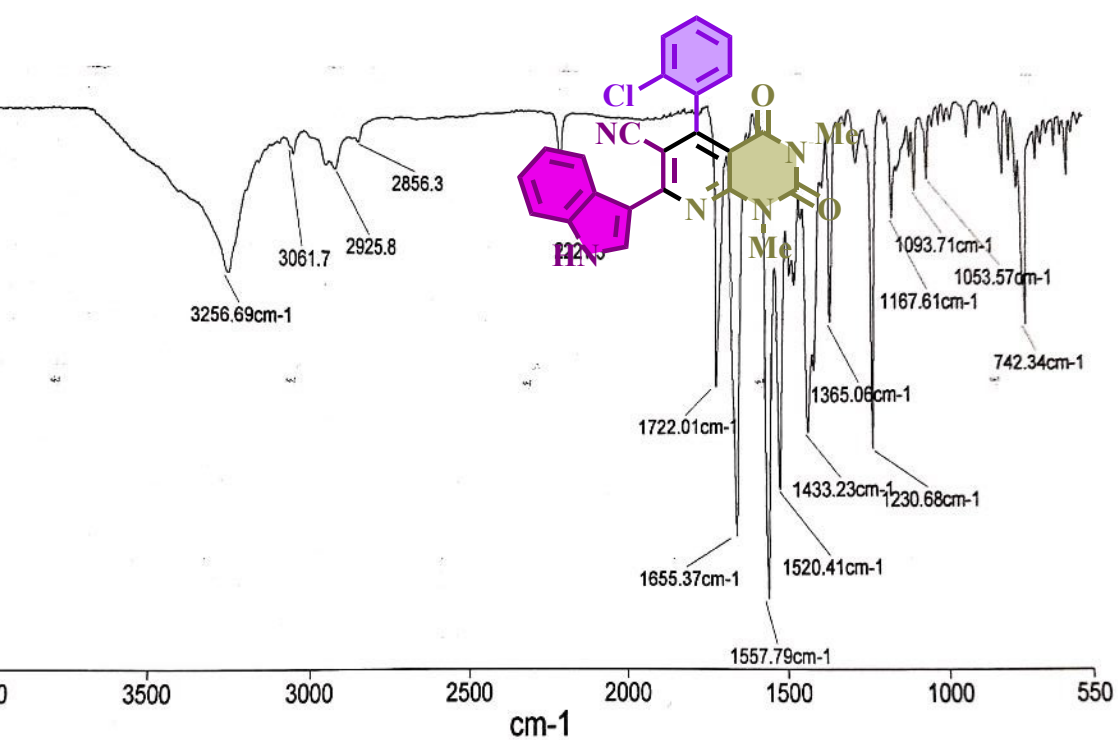
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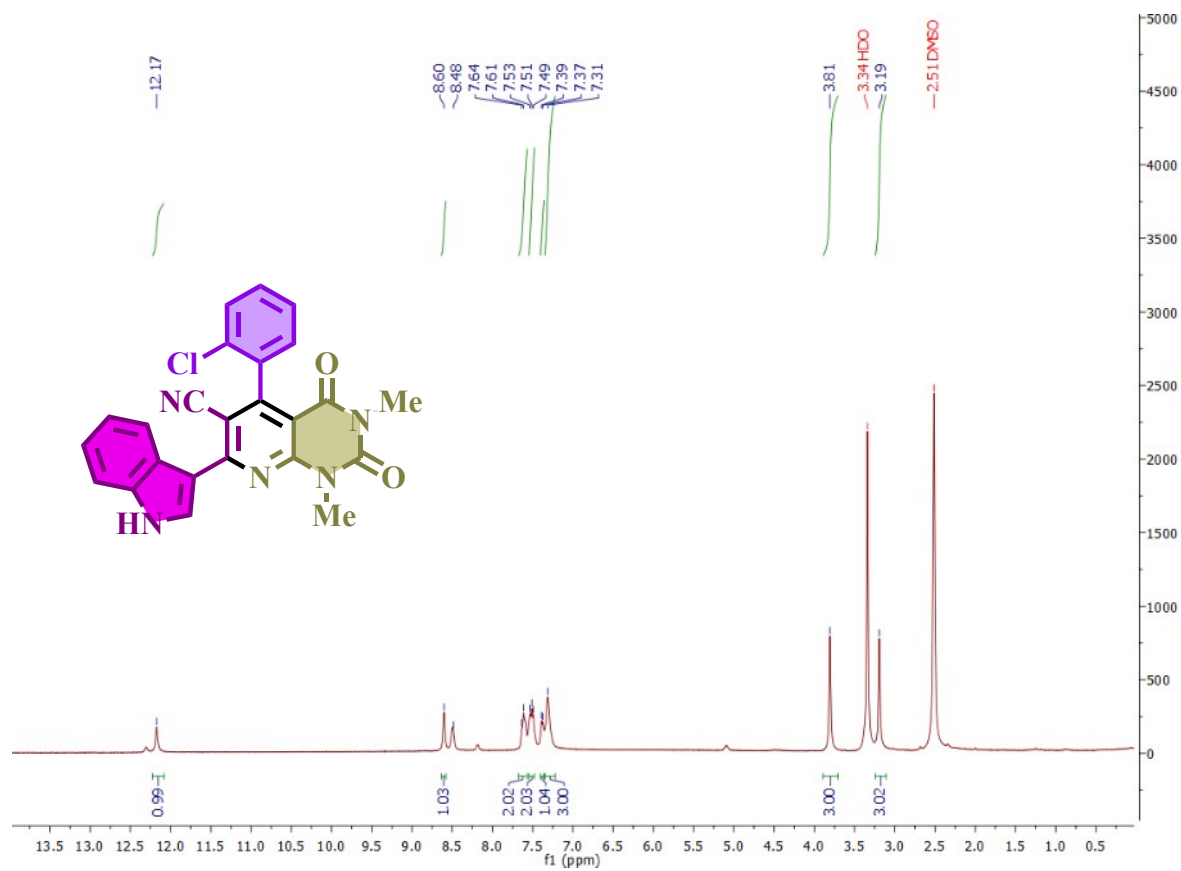
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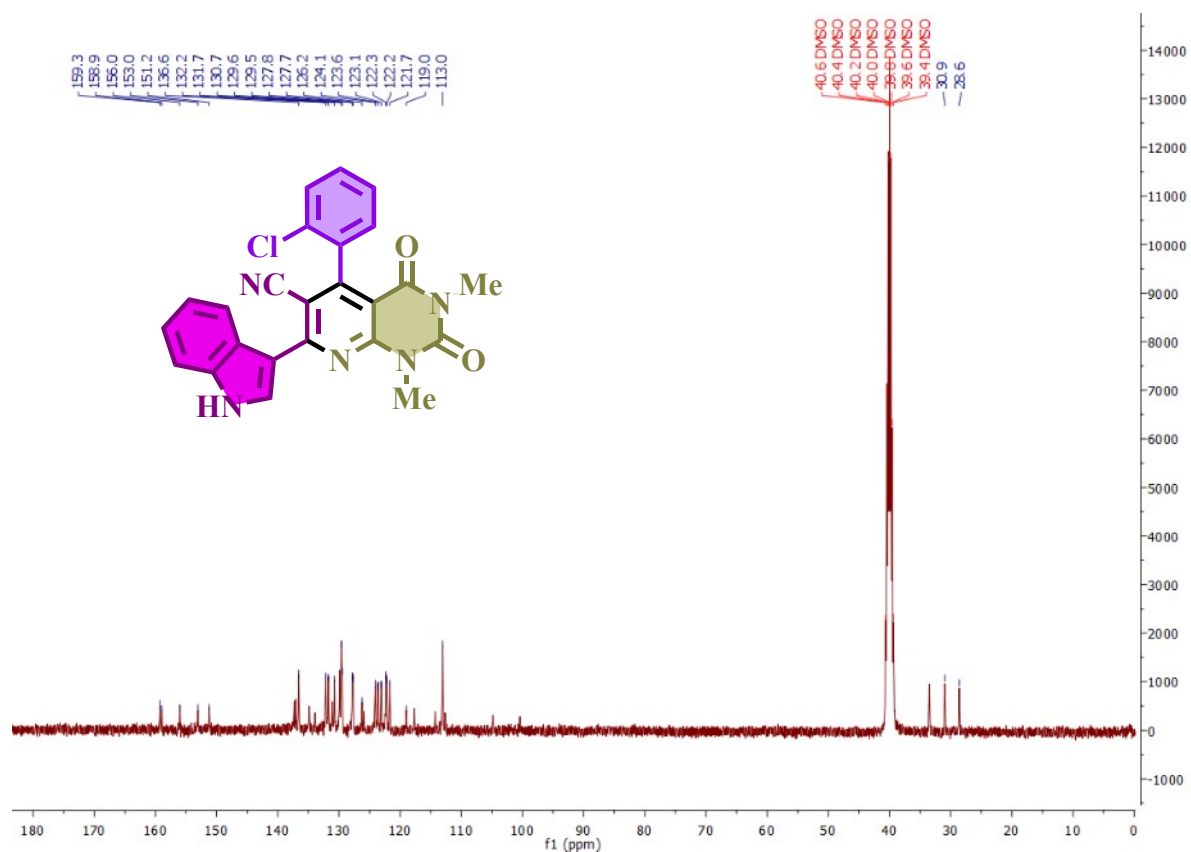
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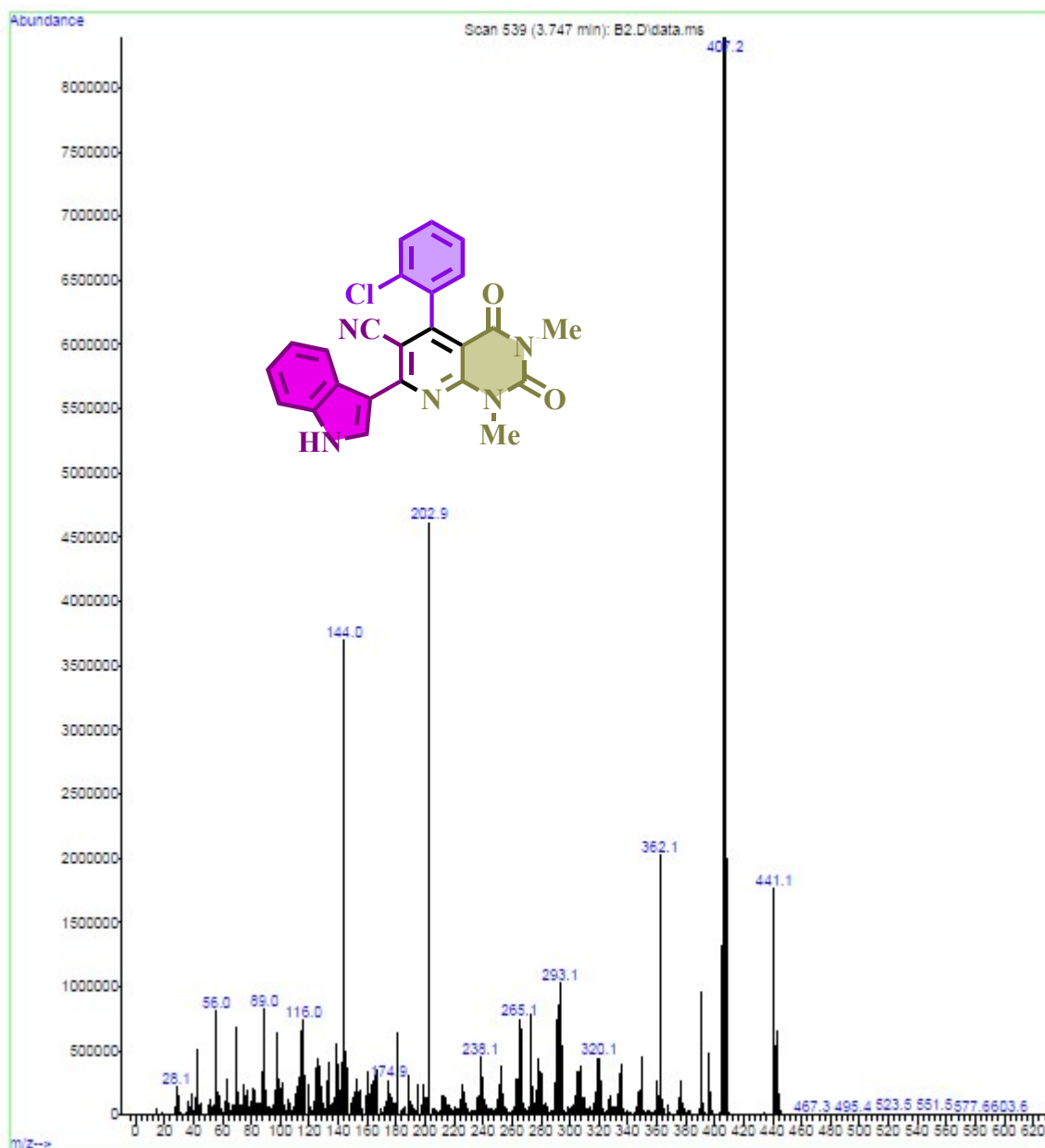
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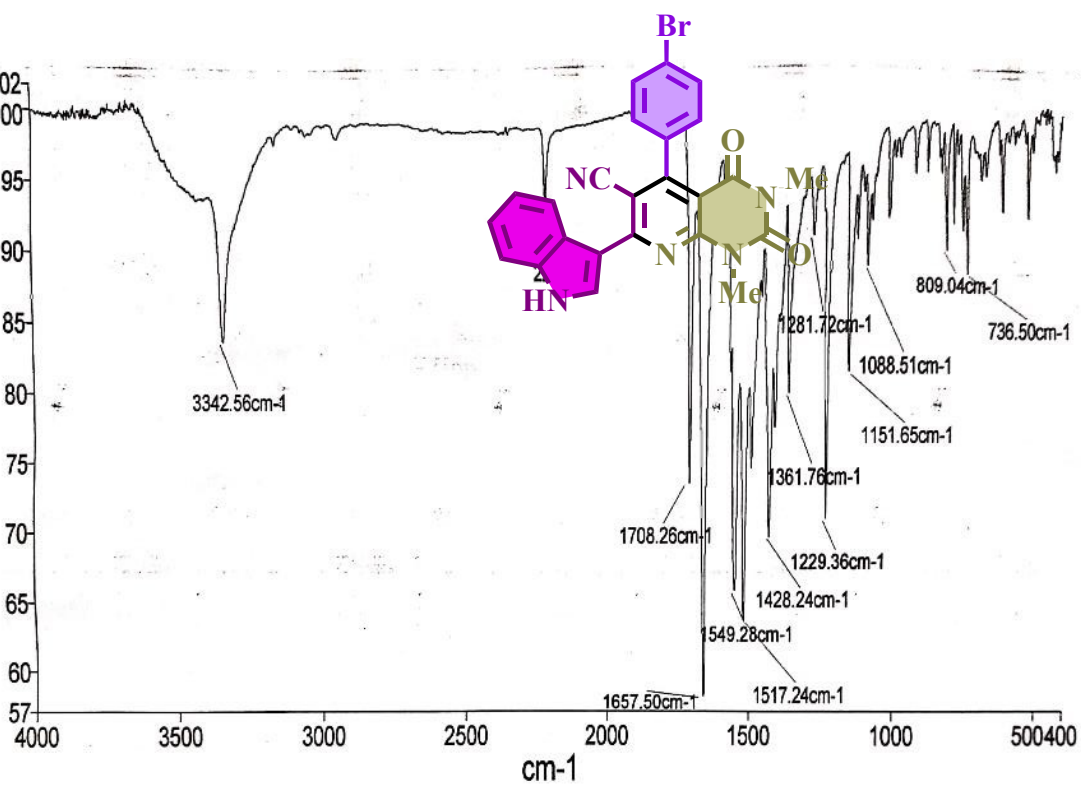
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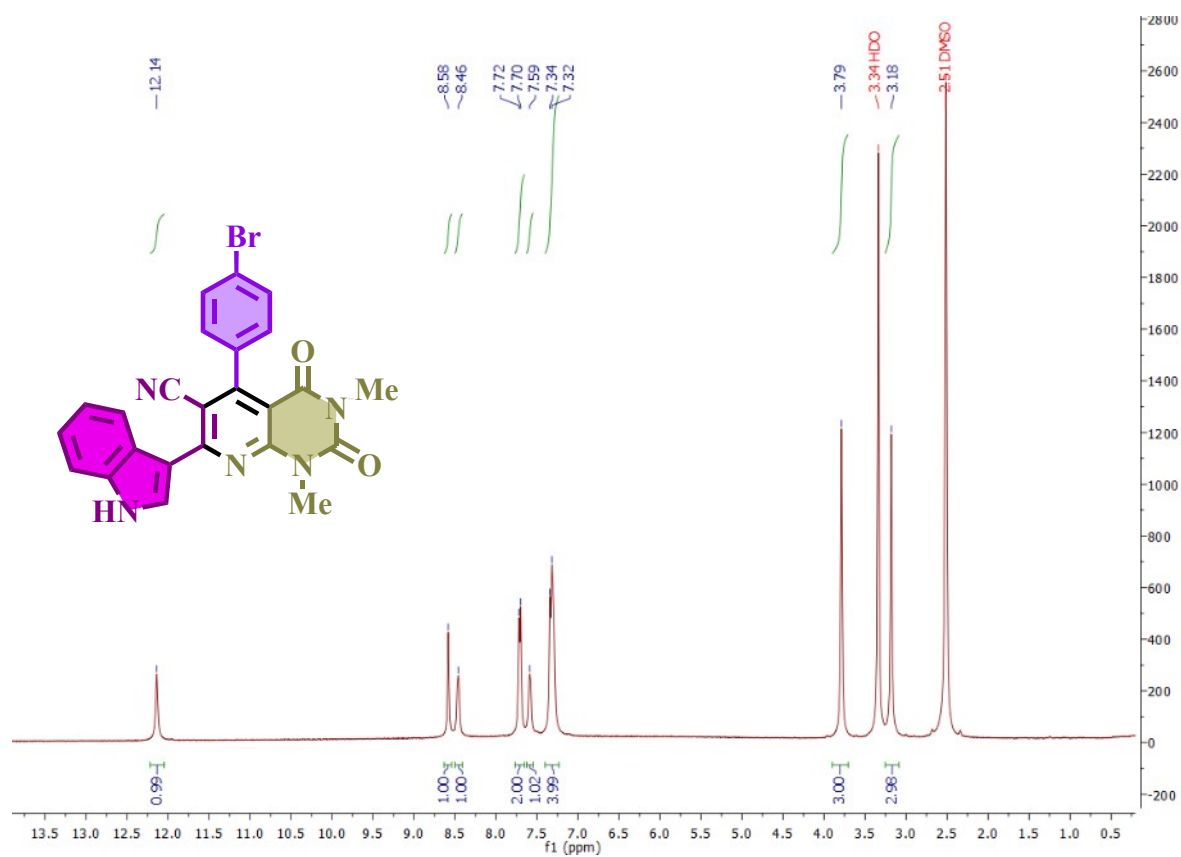
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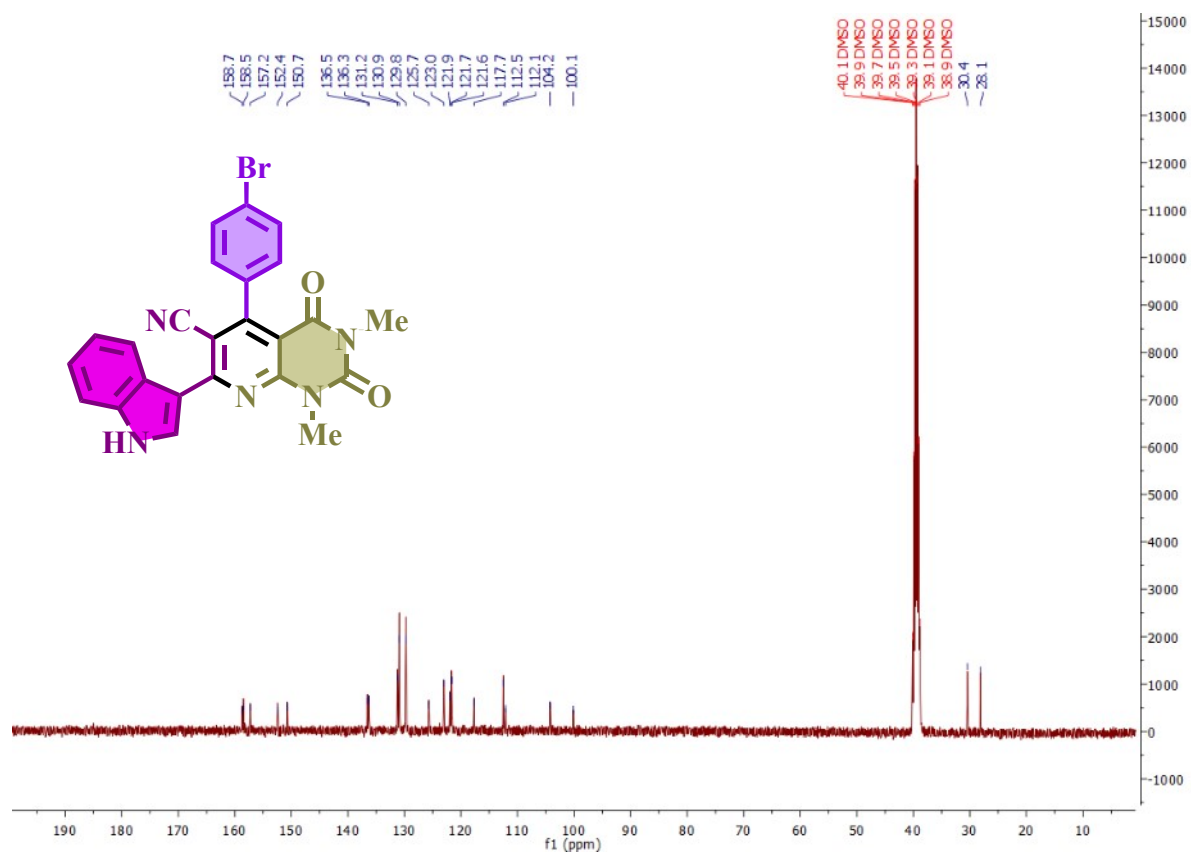
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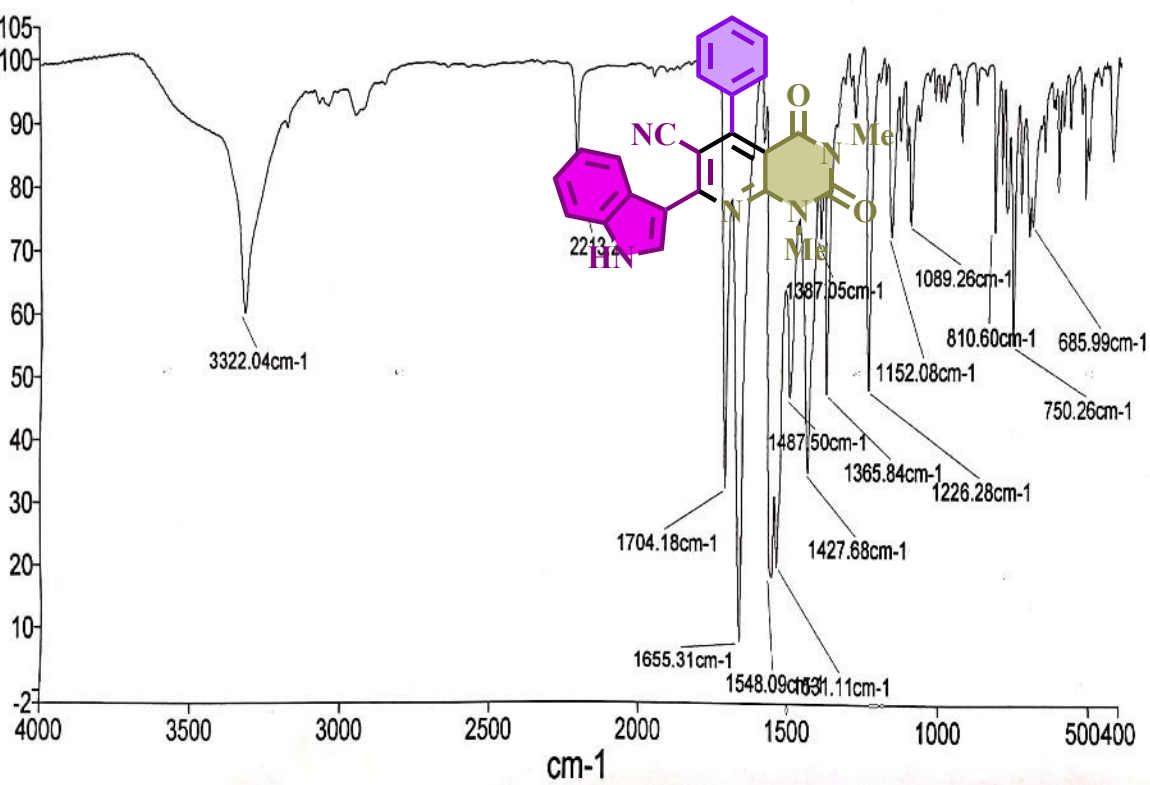
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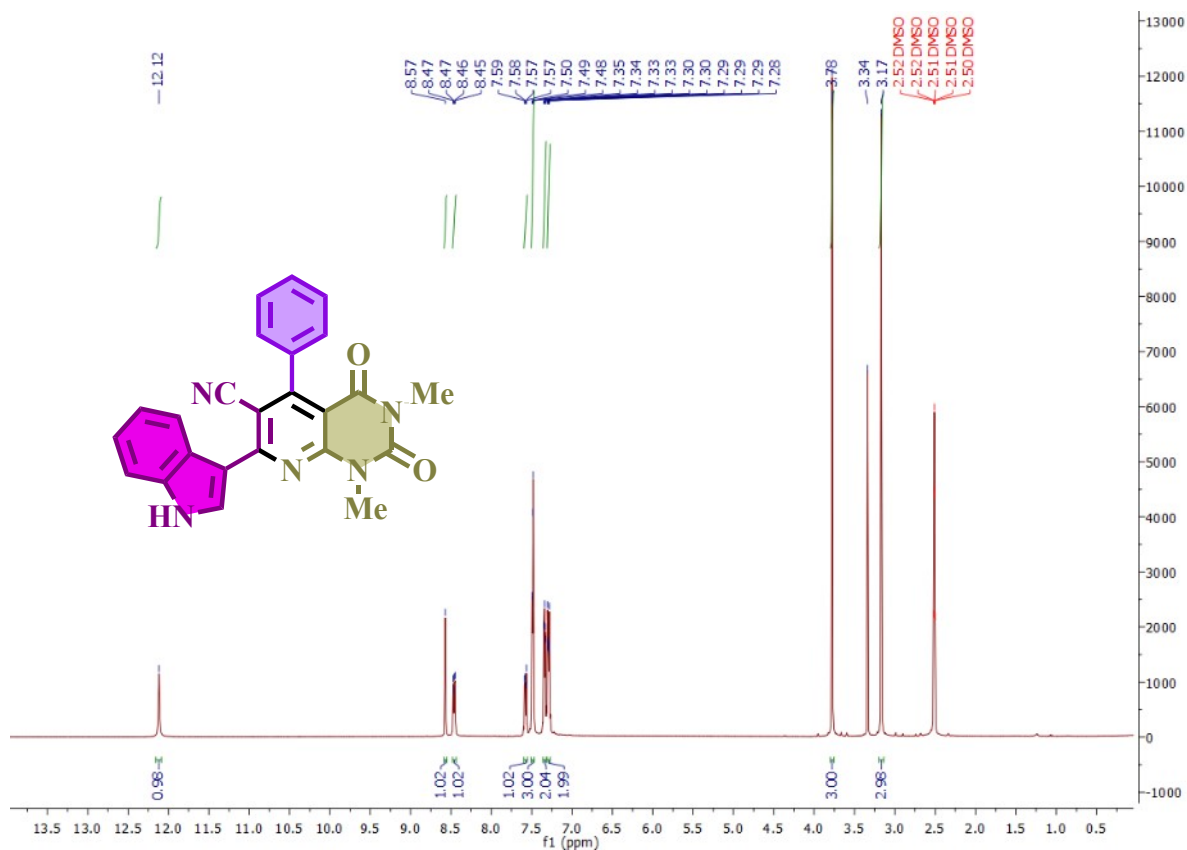
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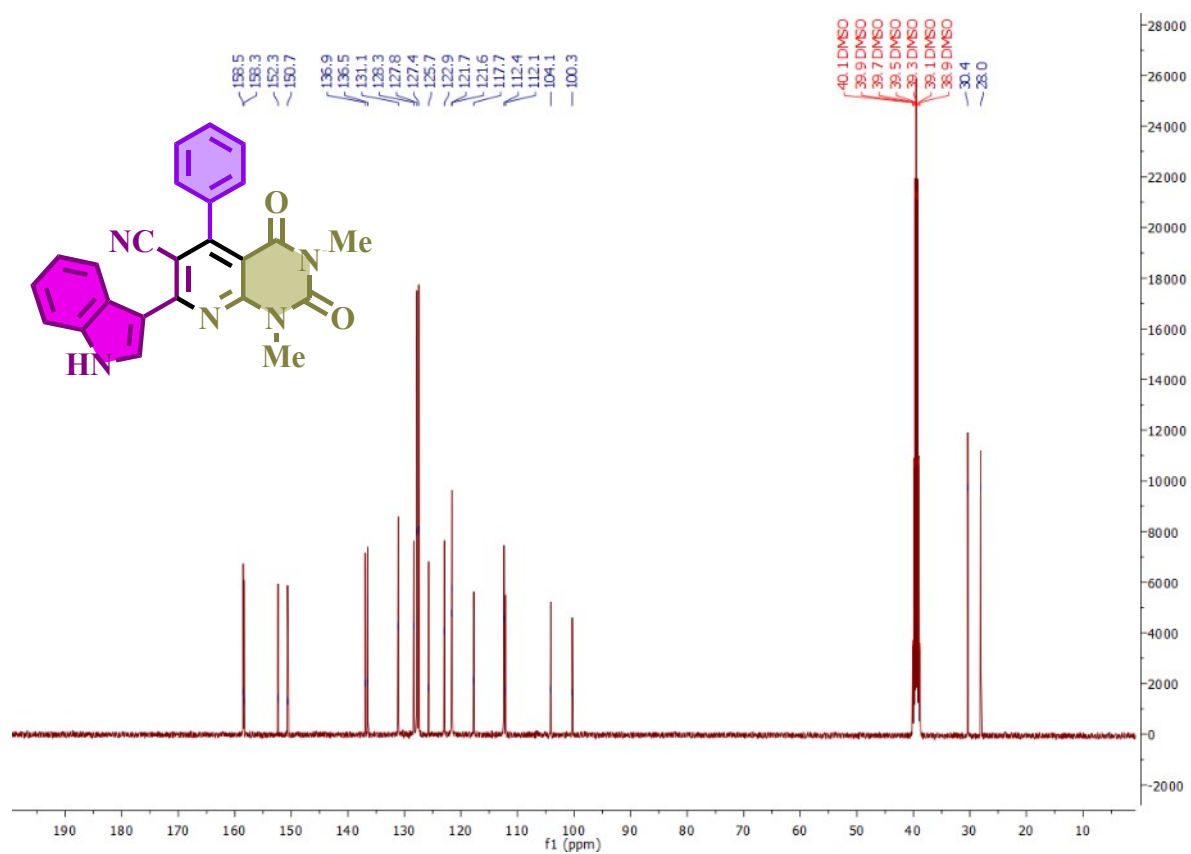
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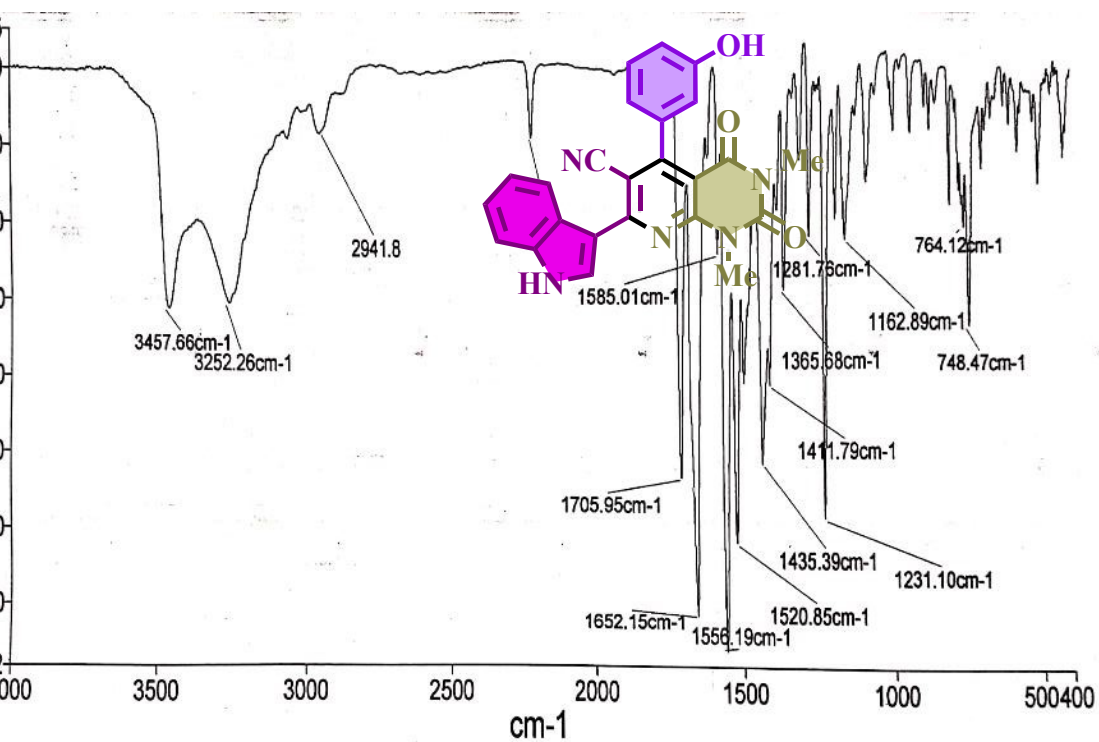
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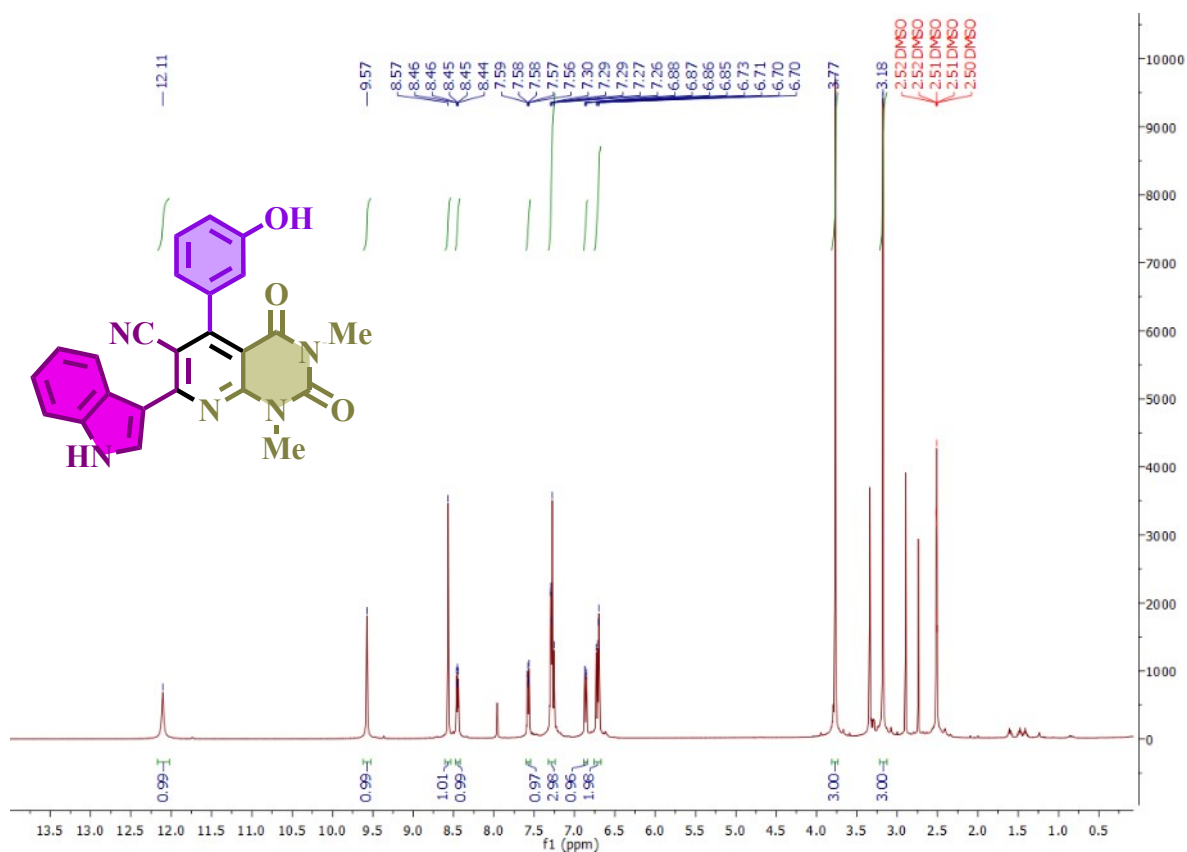
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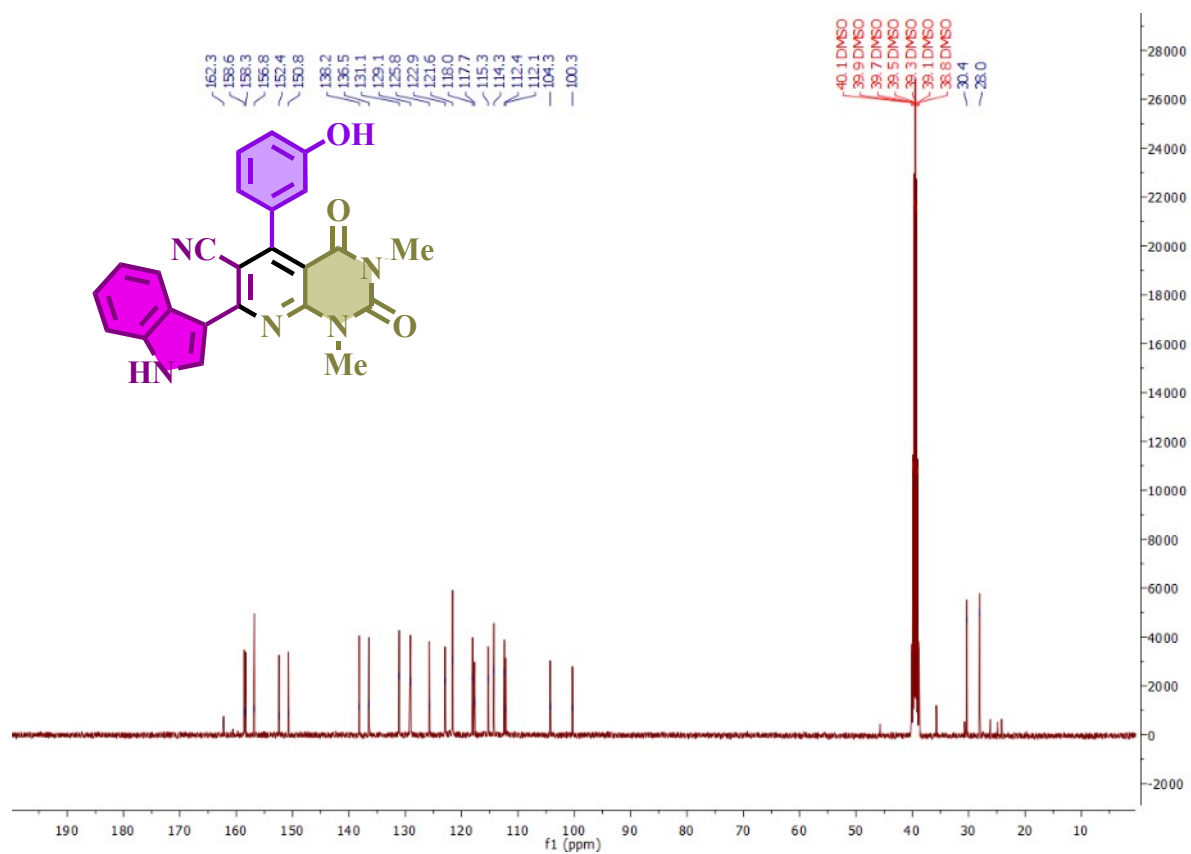
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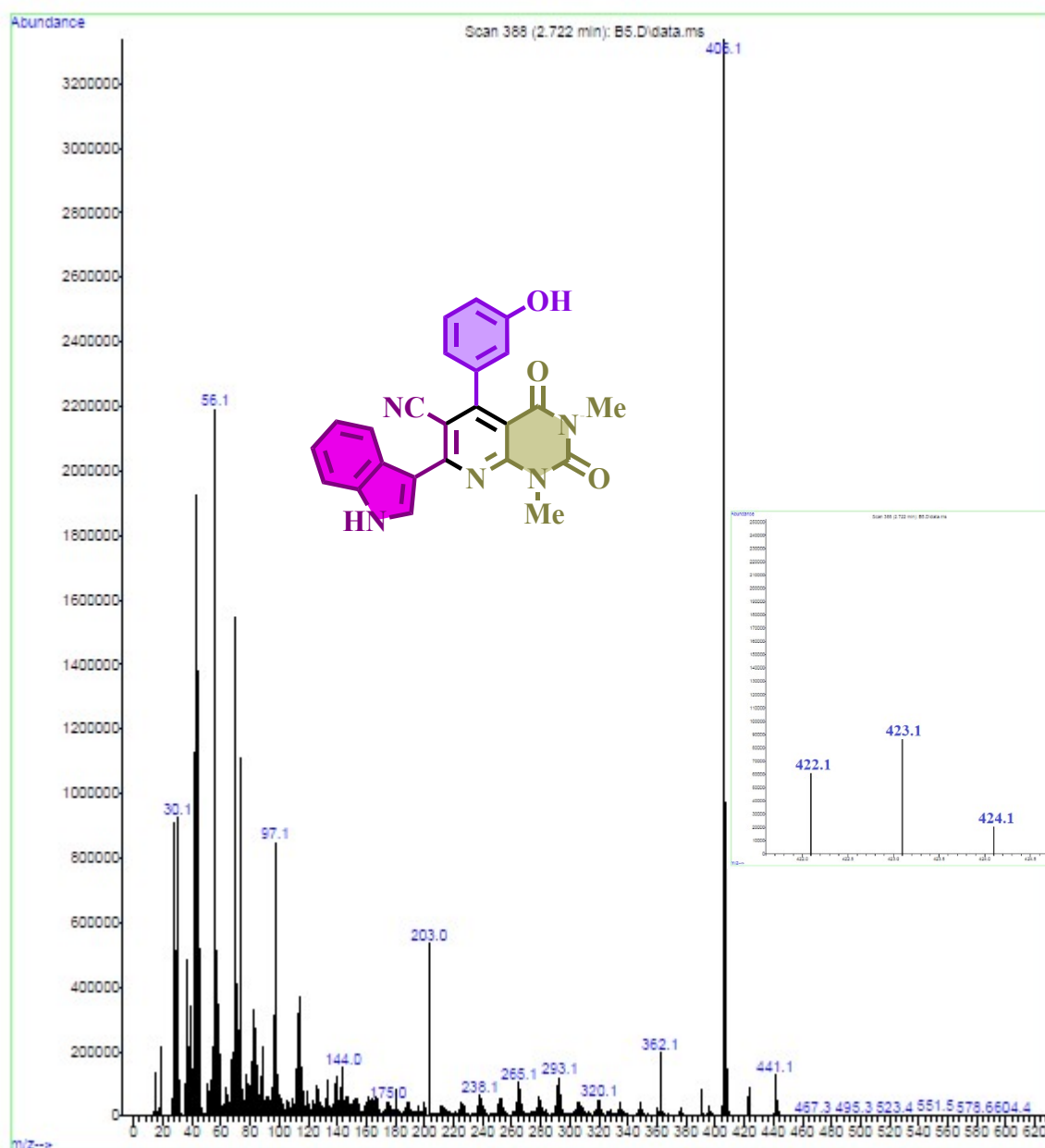
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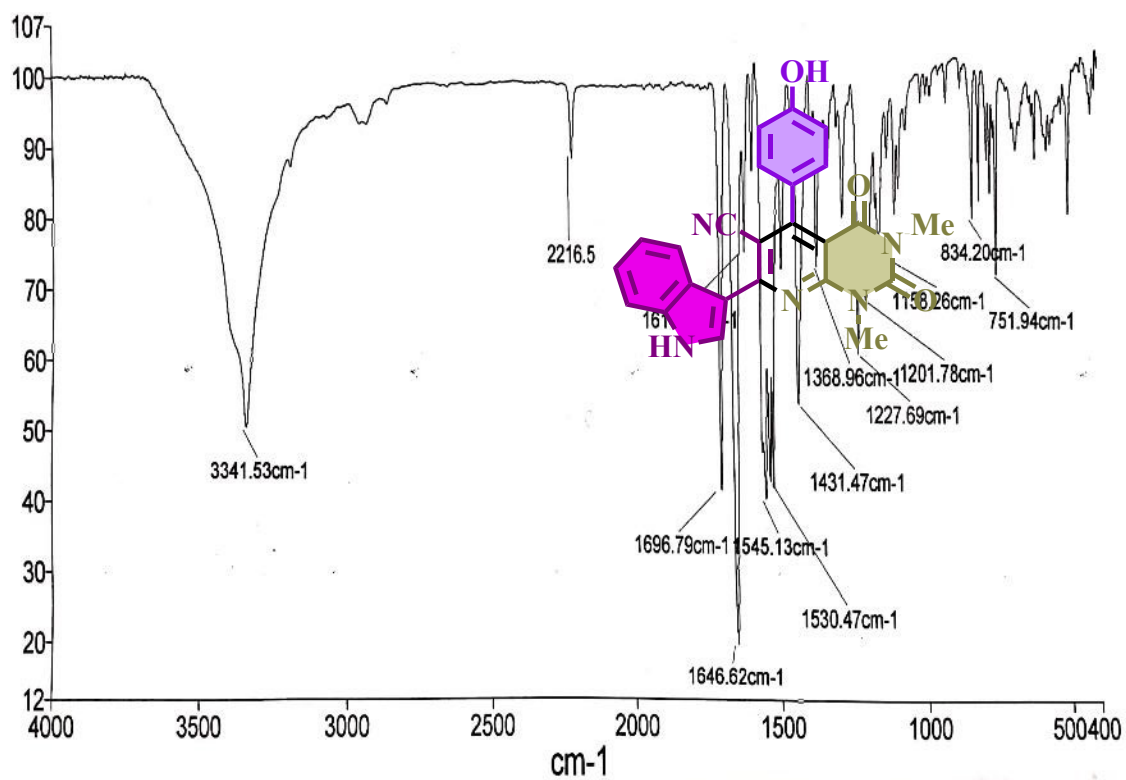
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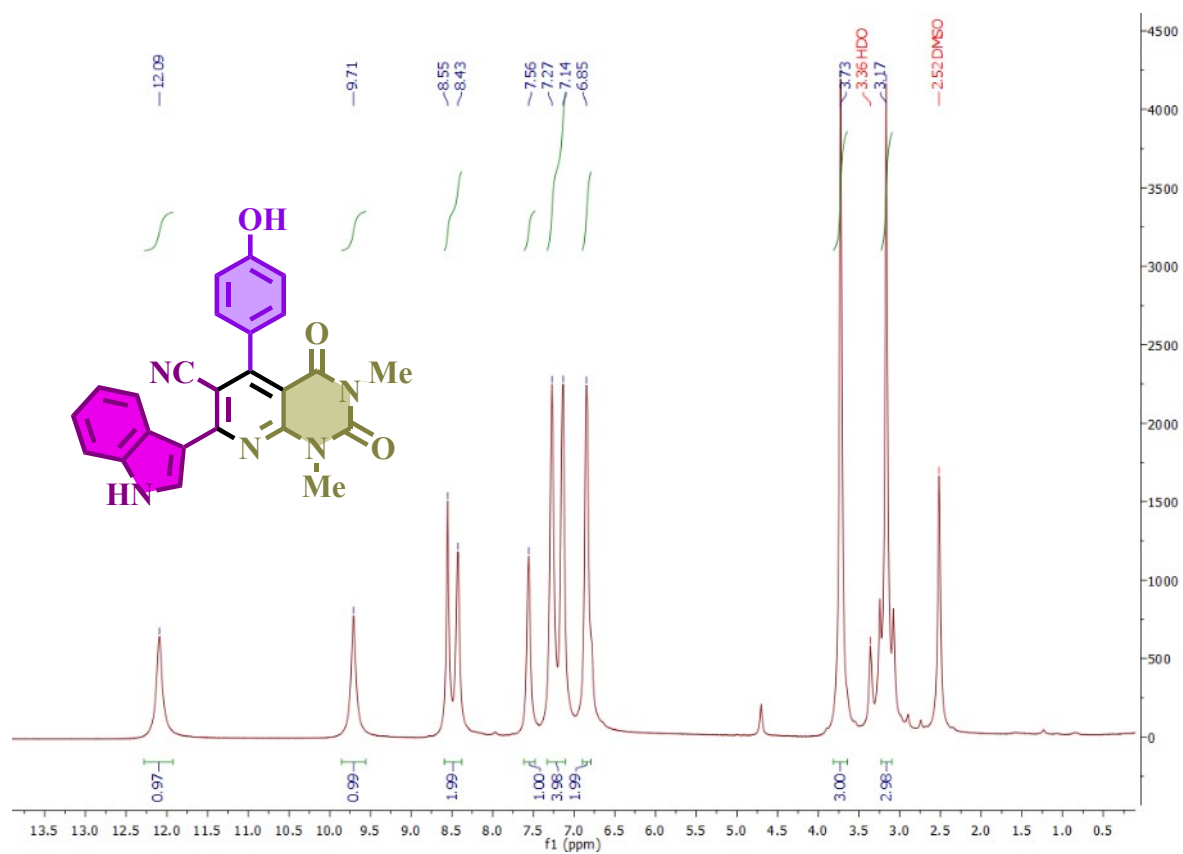
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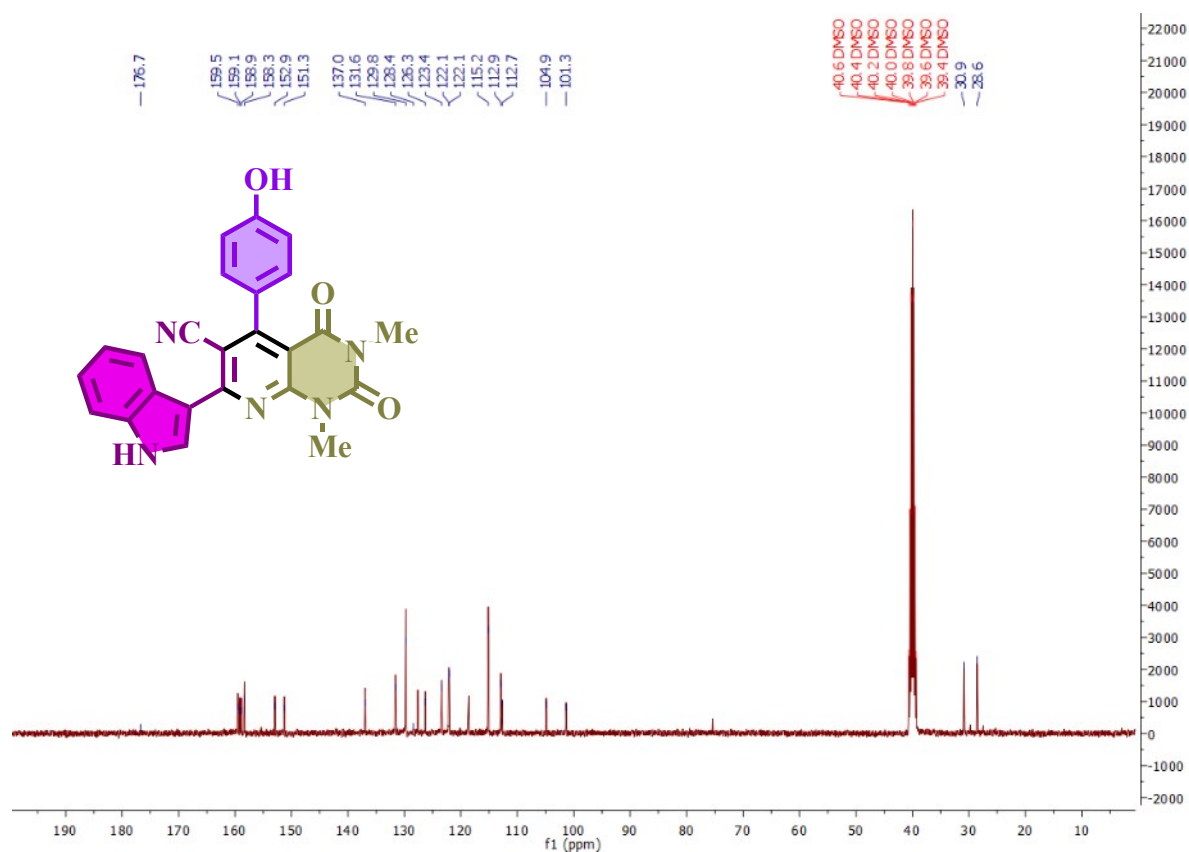
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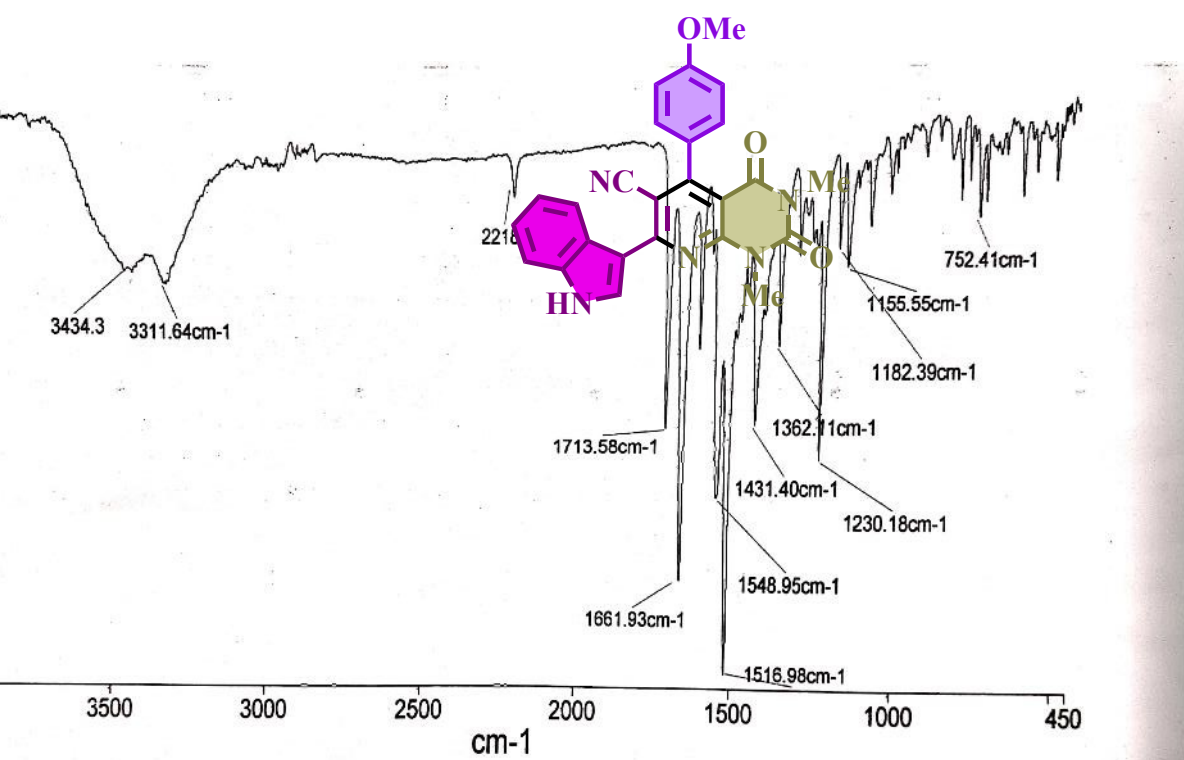
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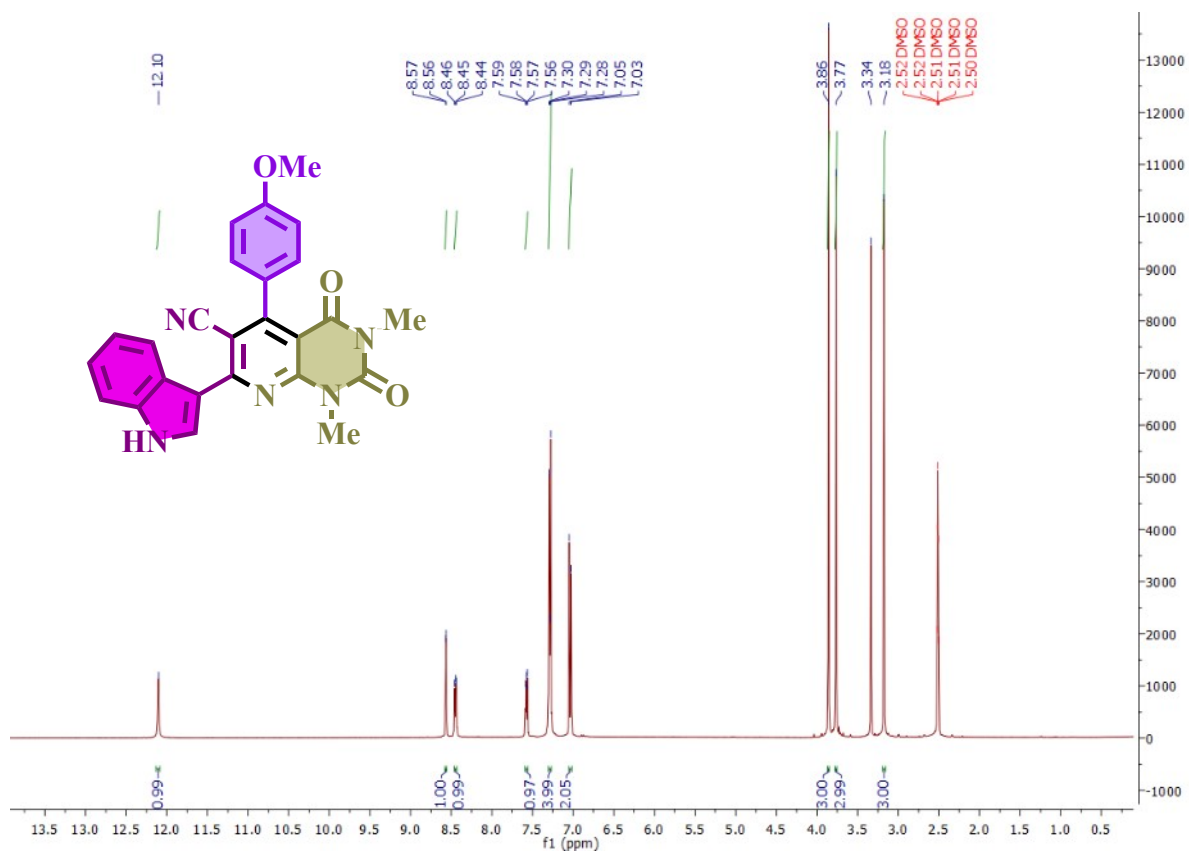
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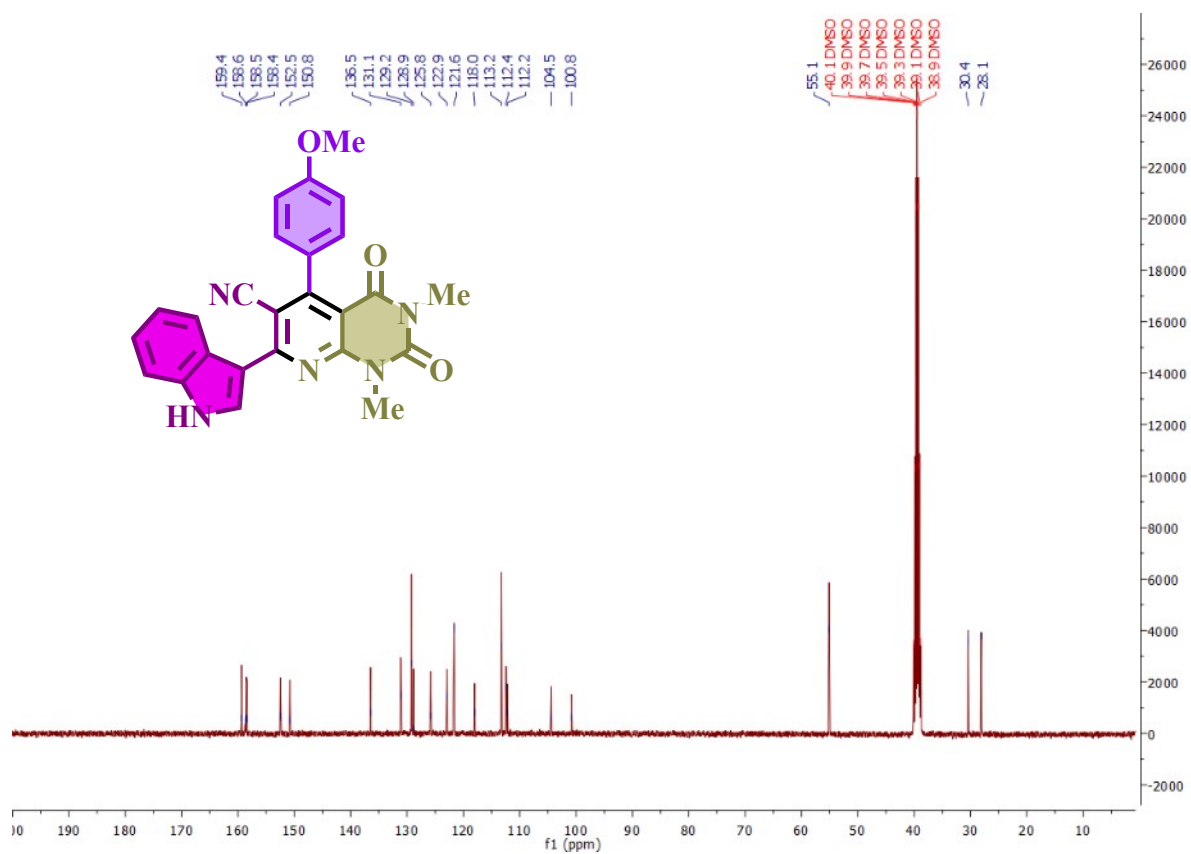
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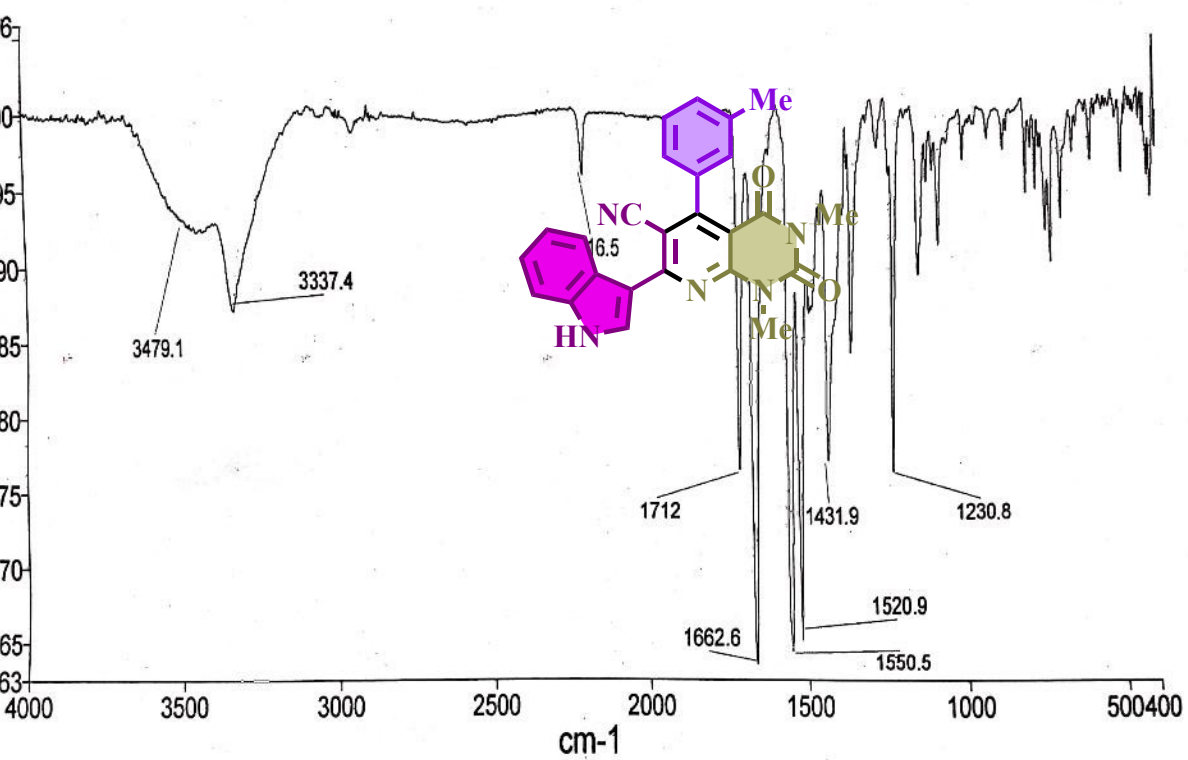
FT-IR spectrum of 7-(1H-indol-3-yl)-5-(4-methoxyphenyl)-1,3-dimethyl-2,4-dioxo-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile (B7)



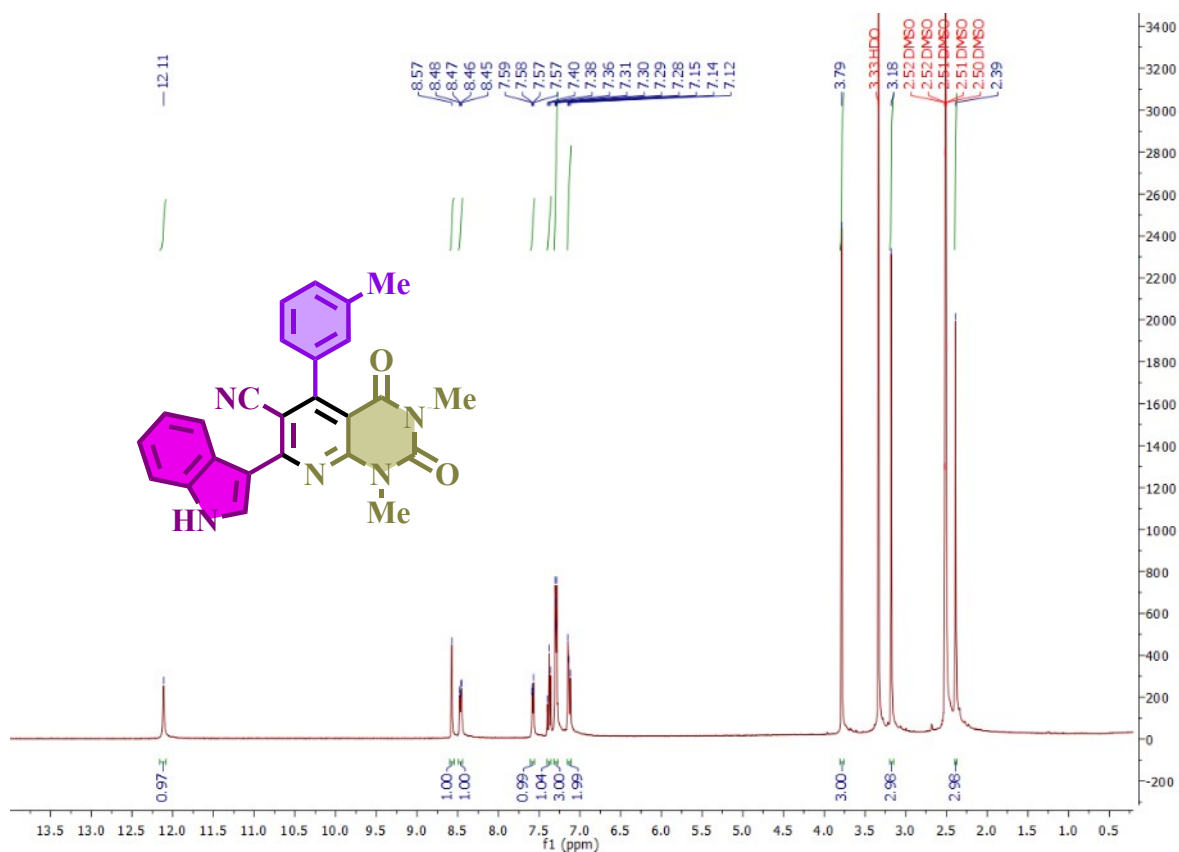
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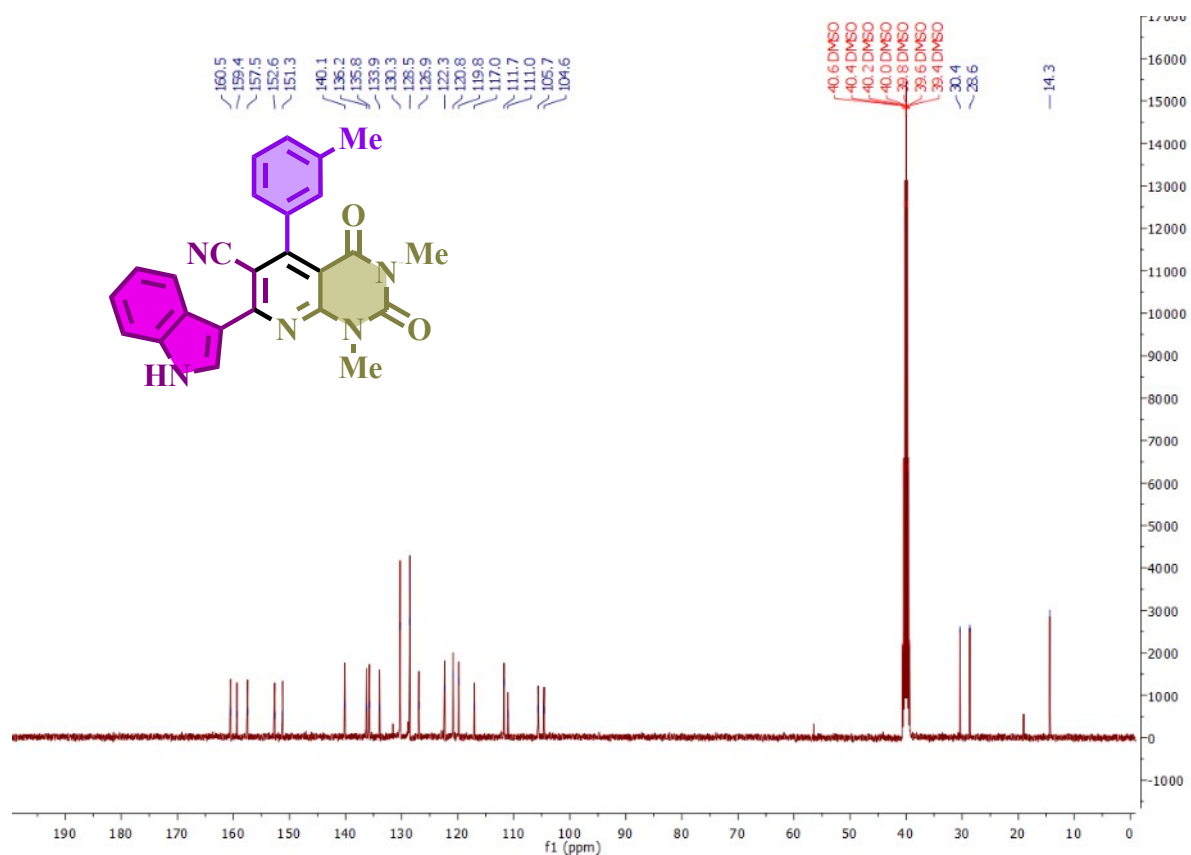
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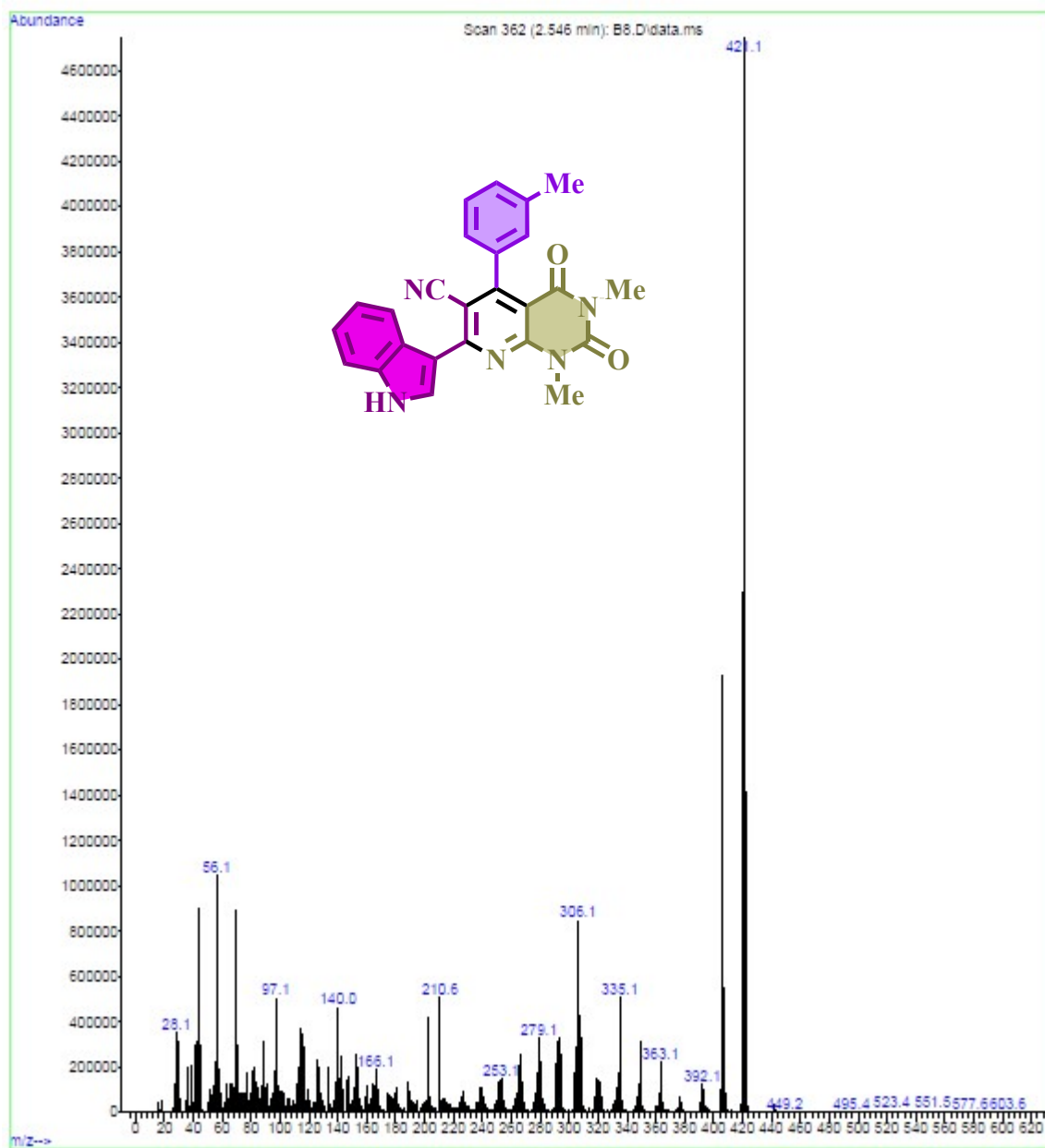
FT-IR spectrum of 7-(1H-indol-3-yl)-1,3-dimethyl-2,4-dioxo-5-(m-tolyl)-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile (B8)



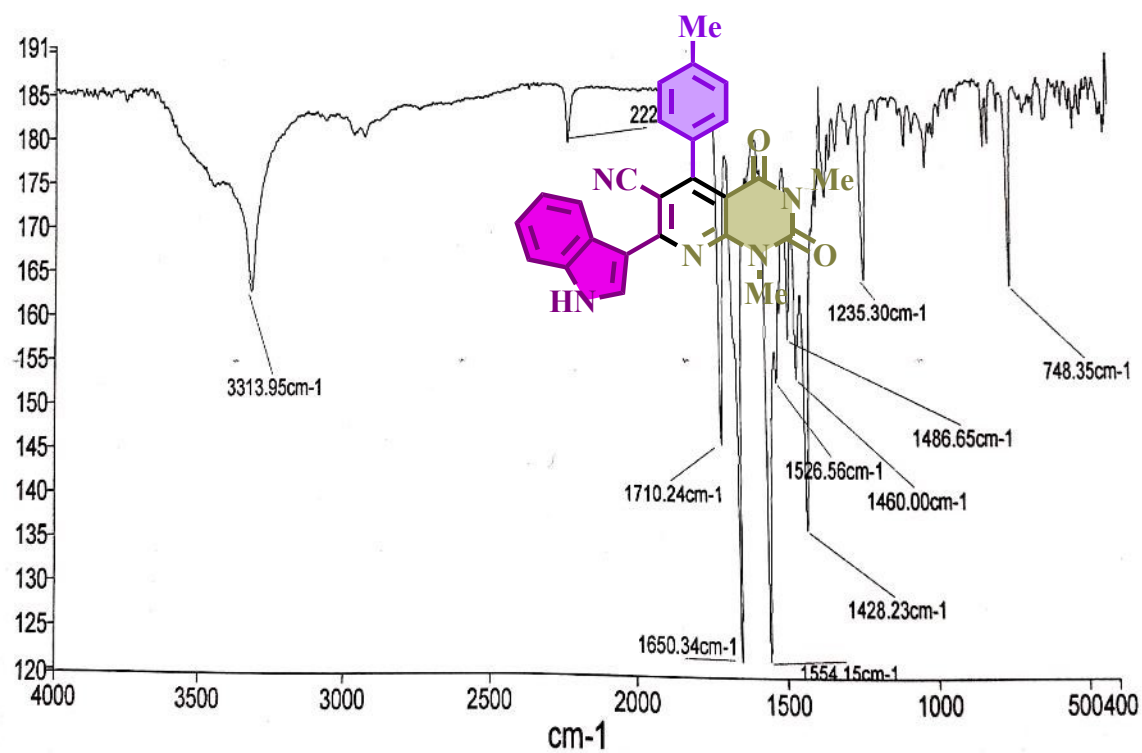
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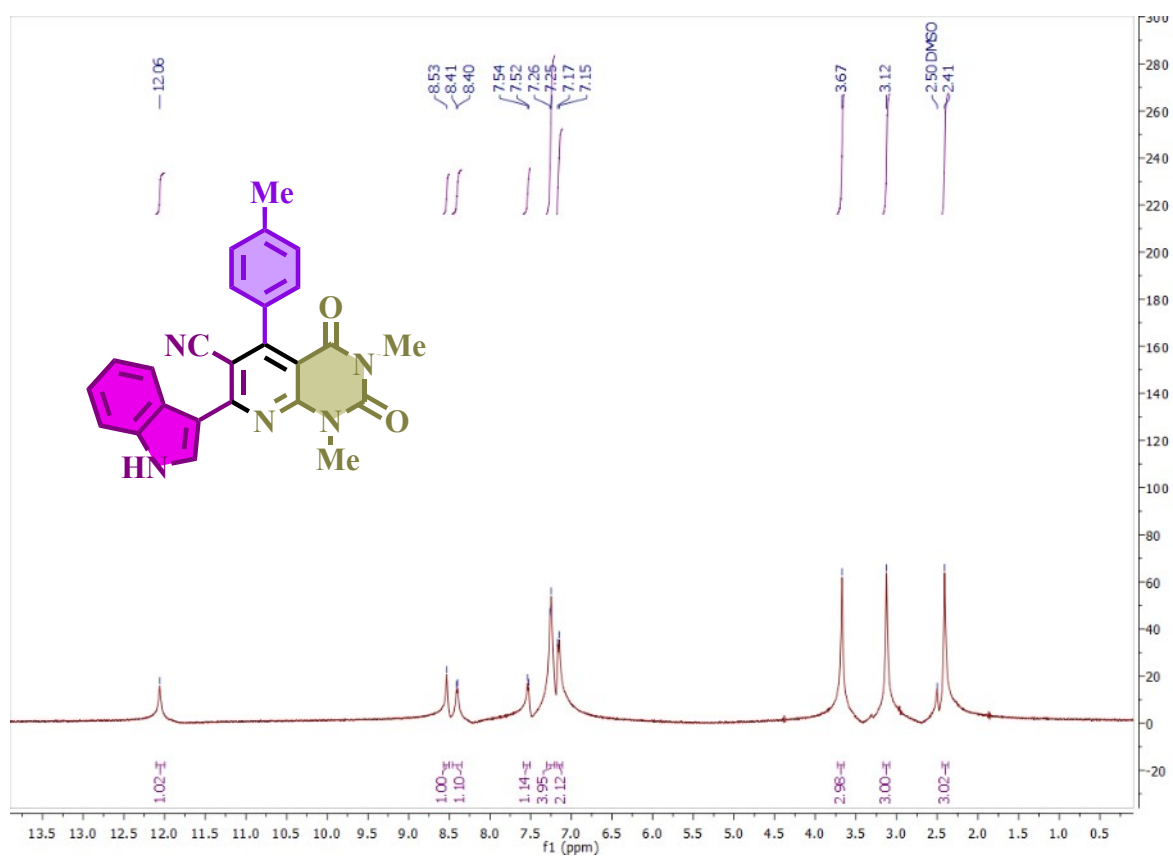
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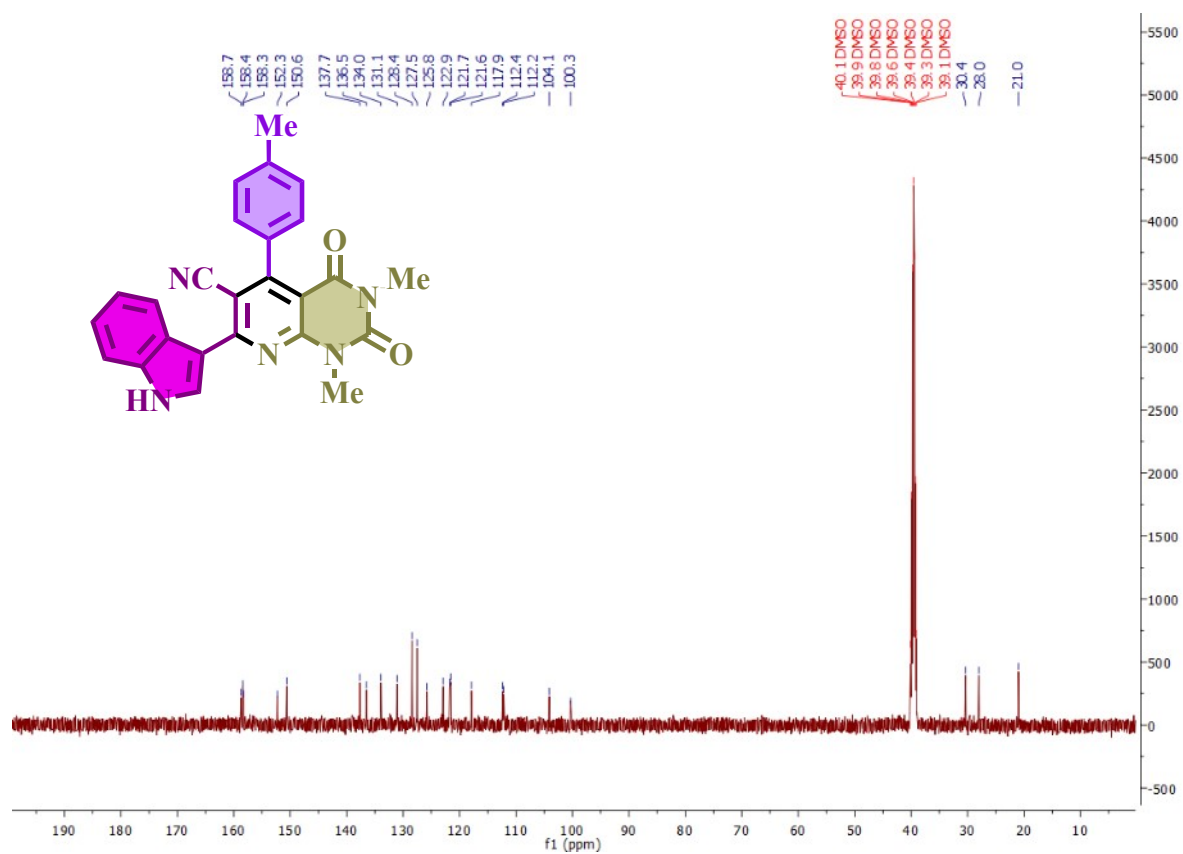
Mass spectrum of 7-(1H-indol-3-yl)-1,3-dimethyl-2,4-dioxo-5-(m-tolyl)-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile (B8)



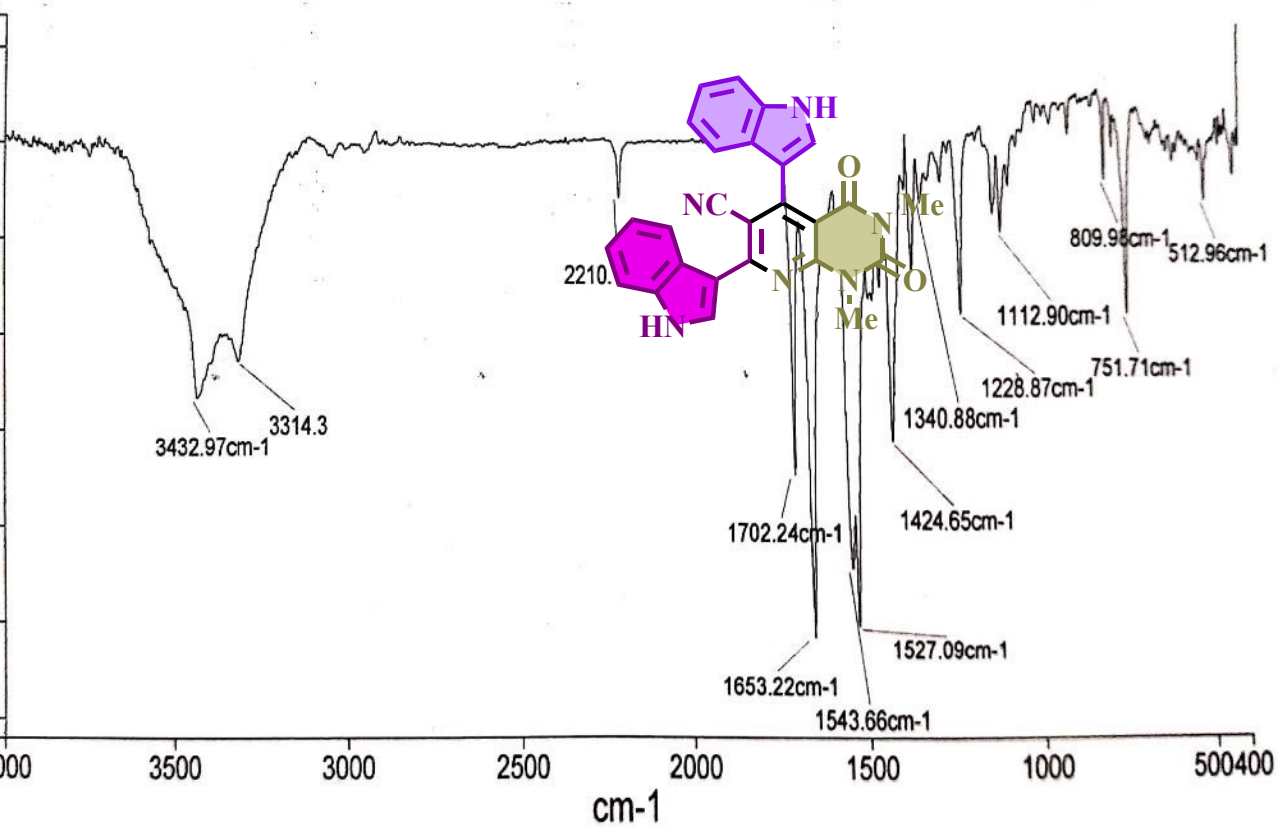
FT-IR spectrum of 7-(1H-indol-3-yl)-1,3-dimethyl-2,4-dioxo-5-(p-tolyl)-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile (B9)



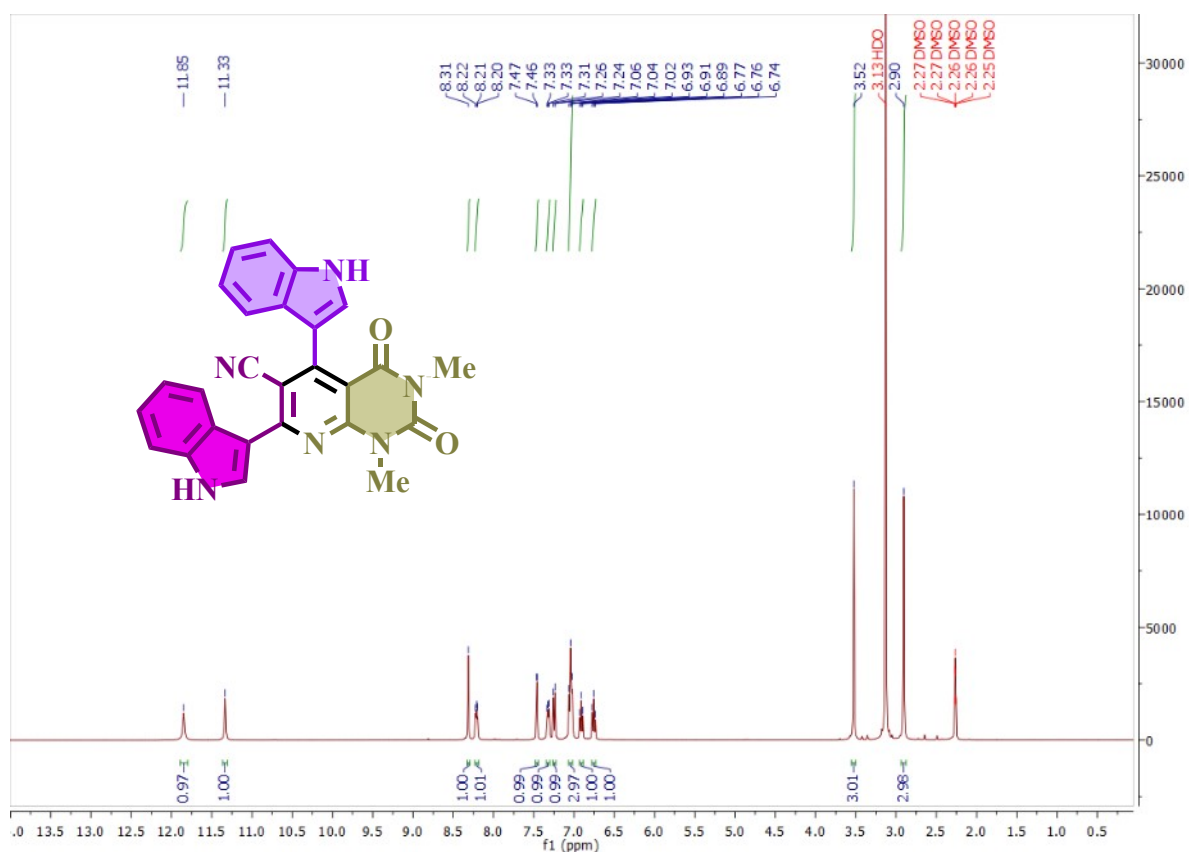
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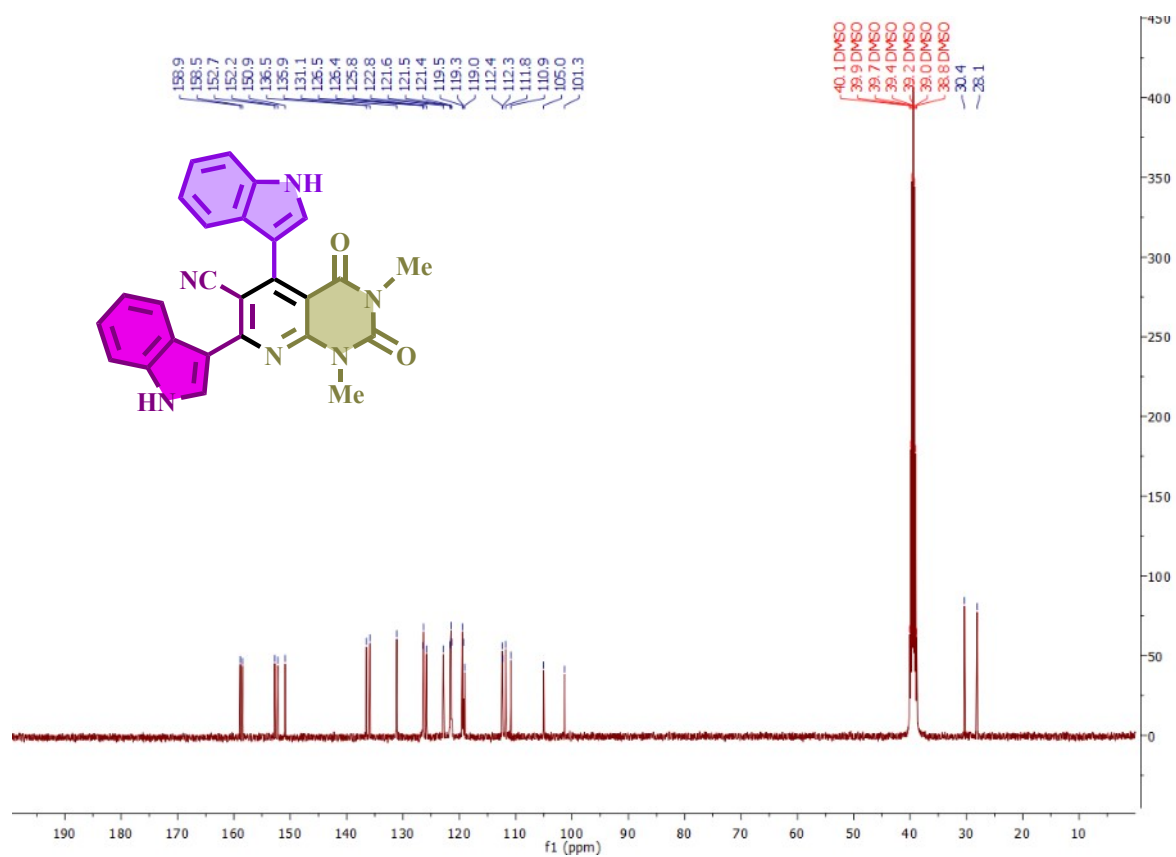
^{13}C -NMR spectrum of 7-(1H-indol-3-yl)-1,3-dimethyl-2,4-dioxo-5-(p-tolyl)-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile (B9)



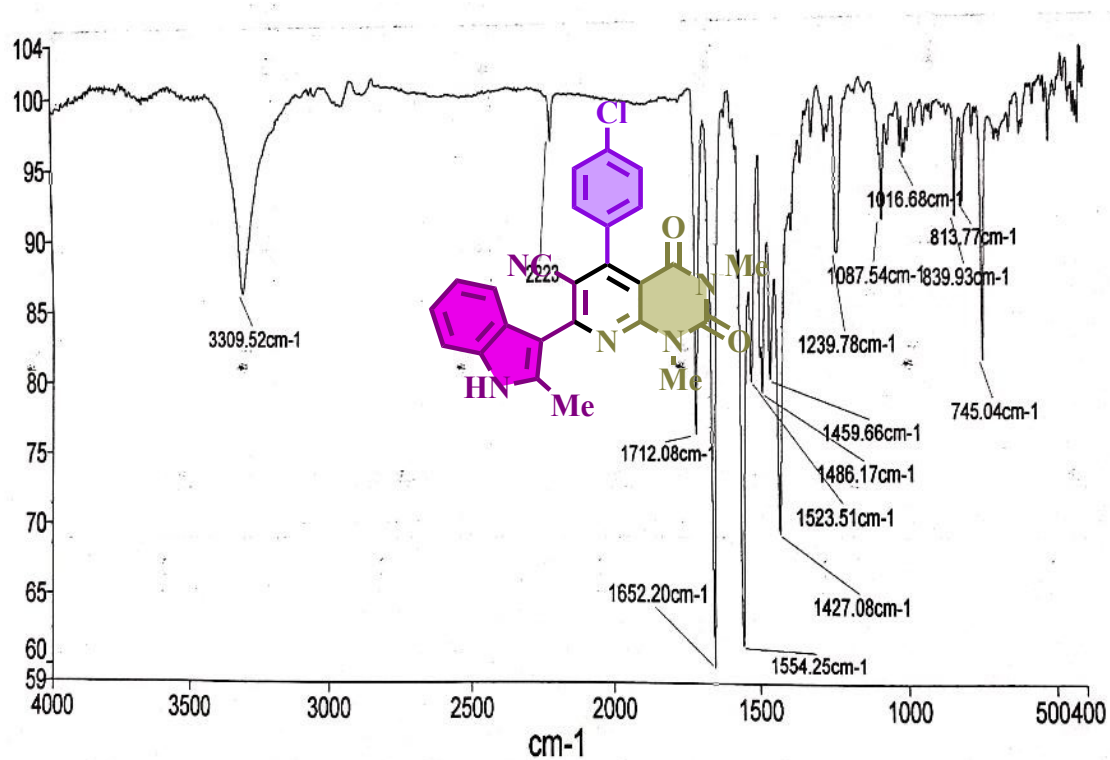
FT-IR spectrum of 5,7-di(1H-indol-3-yl)-1,3-dimethyl-1,2,4-dioxo-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile (B10)



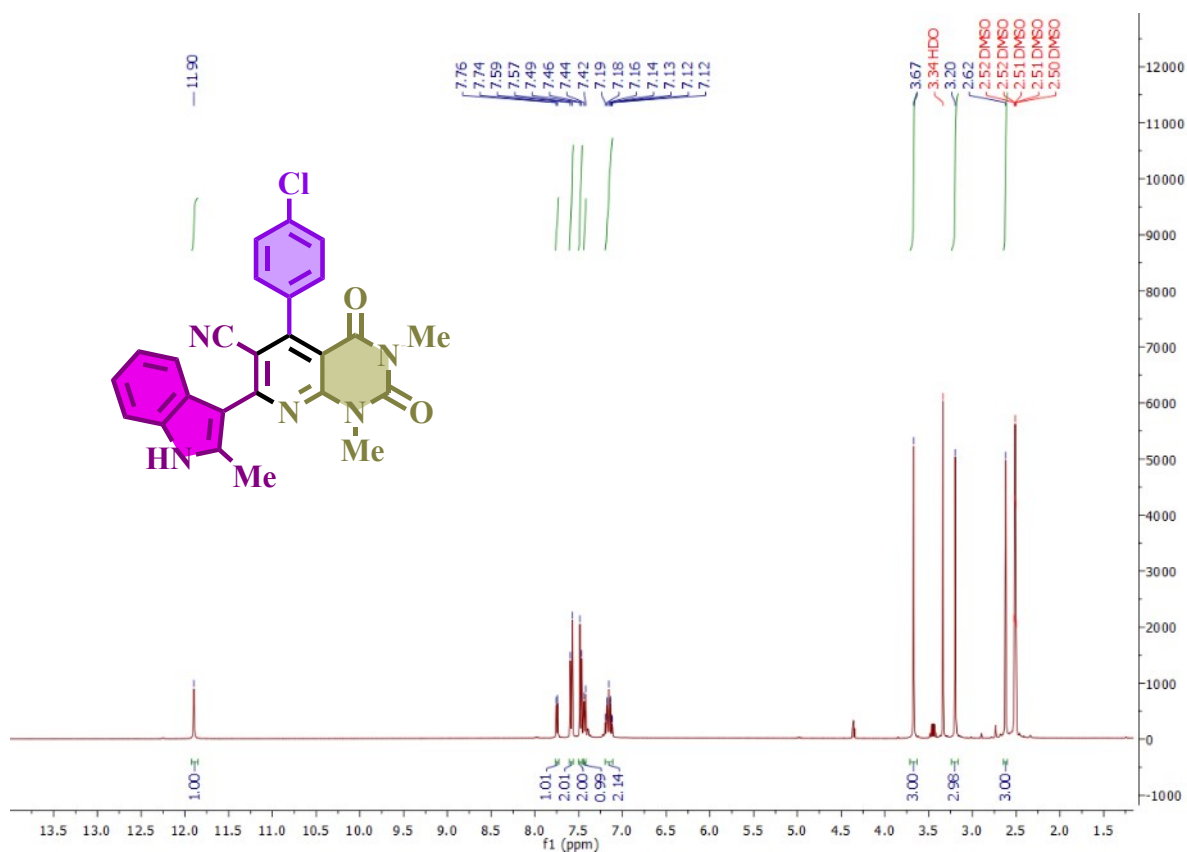
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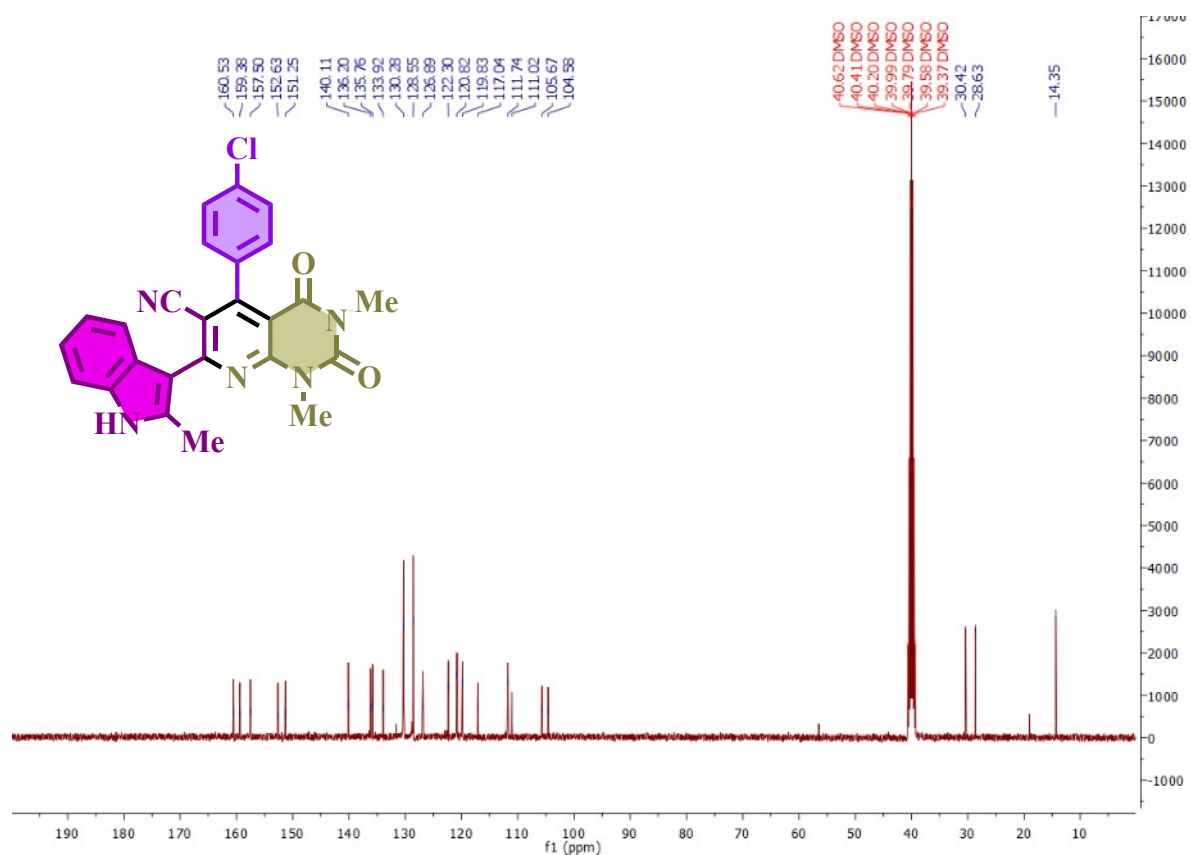
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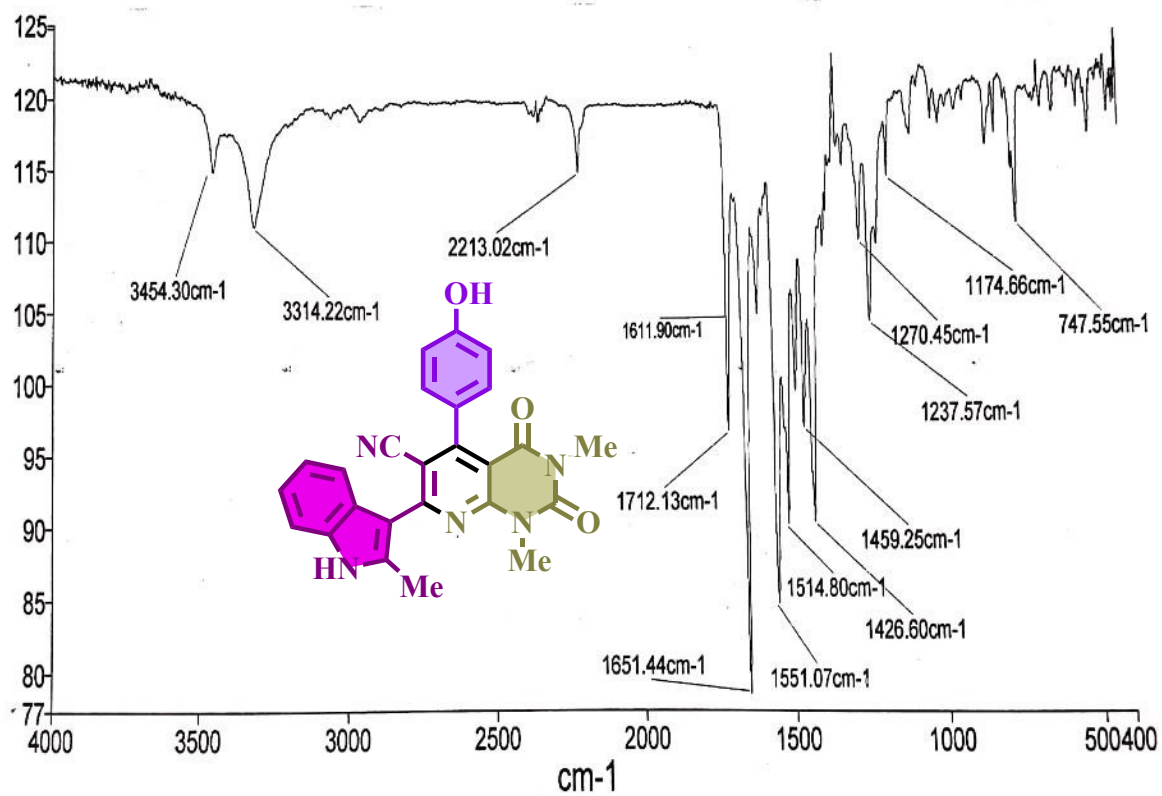
FT-IR spectrum of 5-(4-chlorophenyl)-1,3-dimethyl-7-(2-methyl-1H-indol-3-yl)-2,4-dioxo-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile (C1)



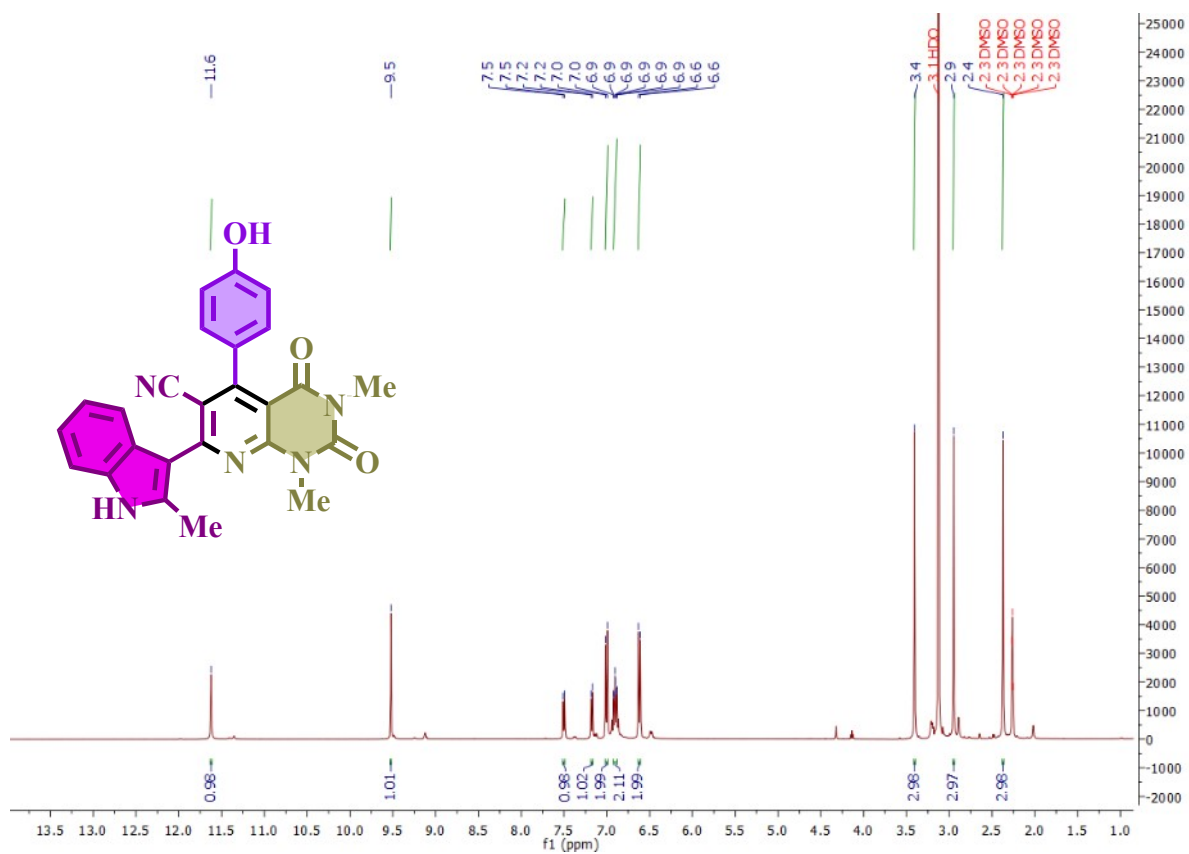
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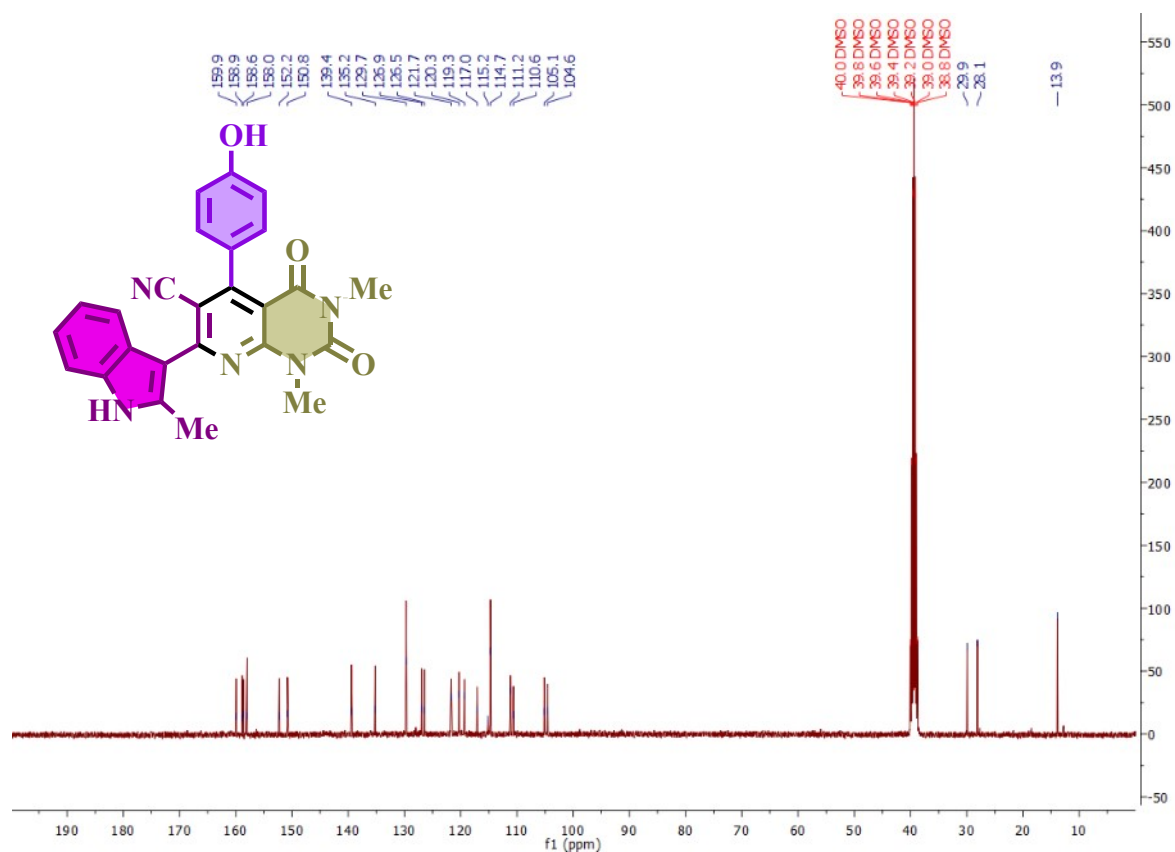
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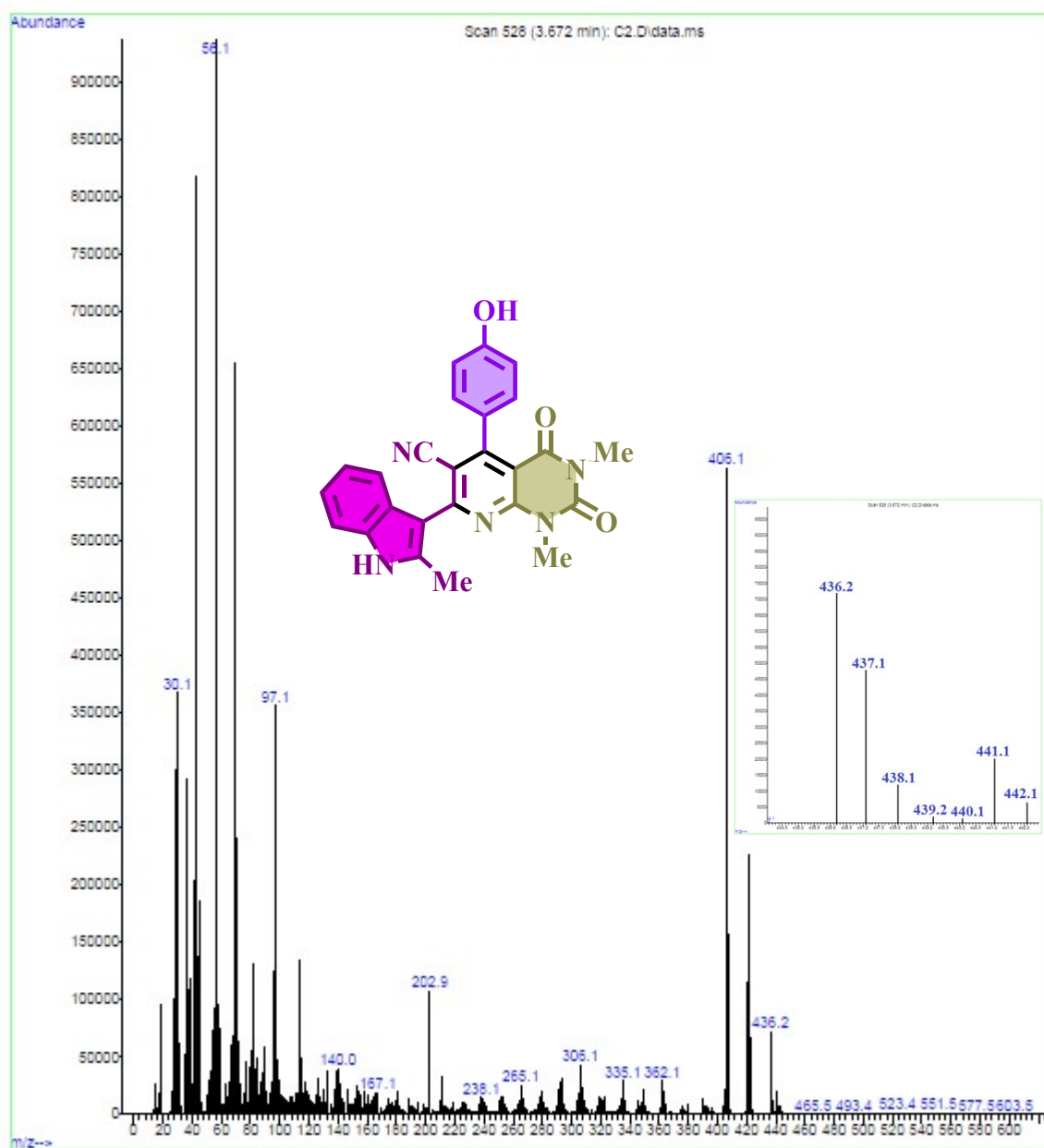
FT-IR spectrum of 5-(4-hydroxyphenyl)-1,3-dimethyl-7-(2-methyl-1H-indol-3-yl)-2,4-dioxo-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile (C2)



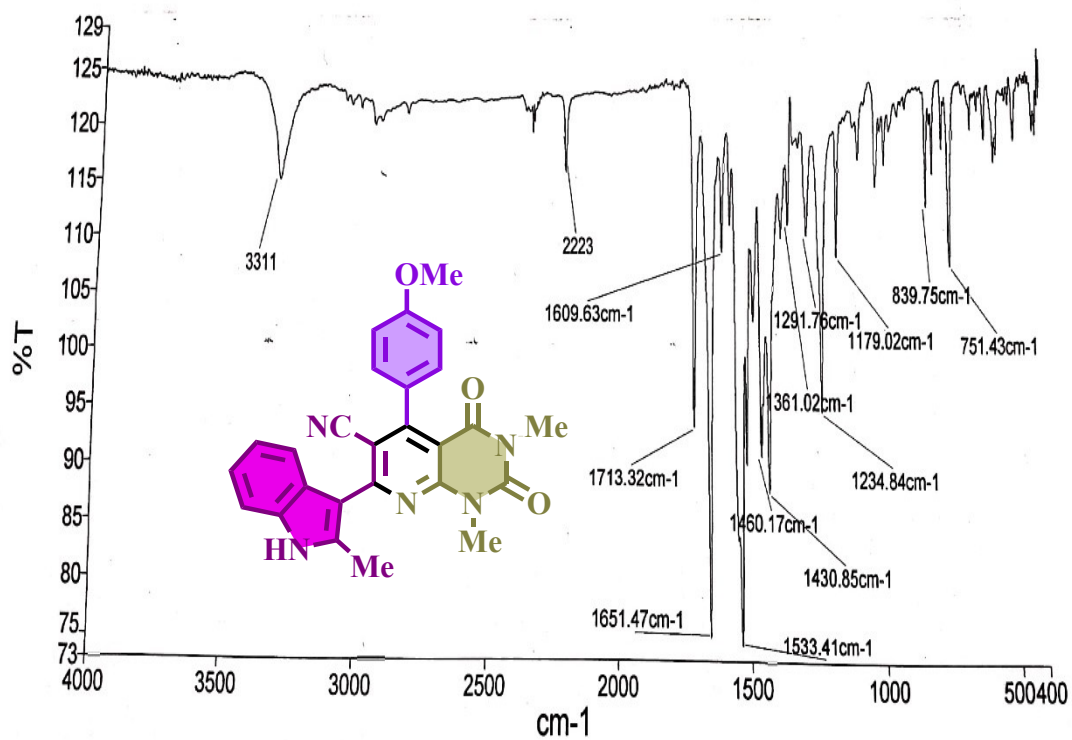
¹H-NMR spectrum of 5-(4-hydroxyphenyl)-1,3-dimethyl-7-(2-methyl-1H-indol-3-yl)-2,4-dioxo-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile (C2)



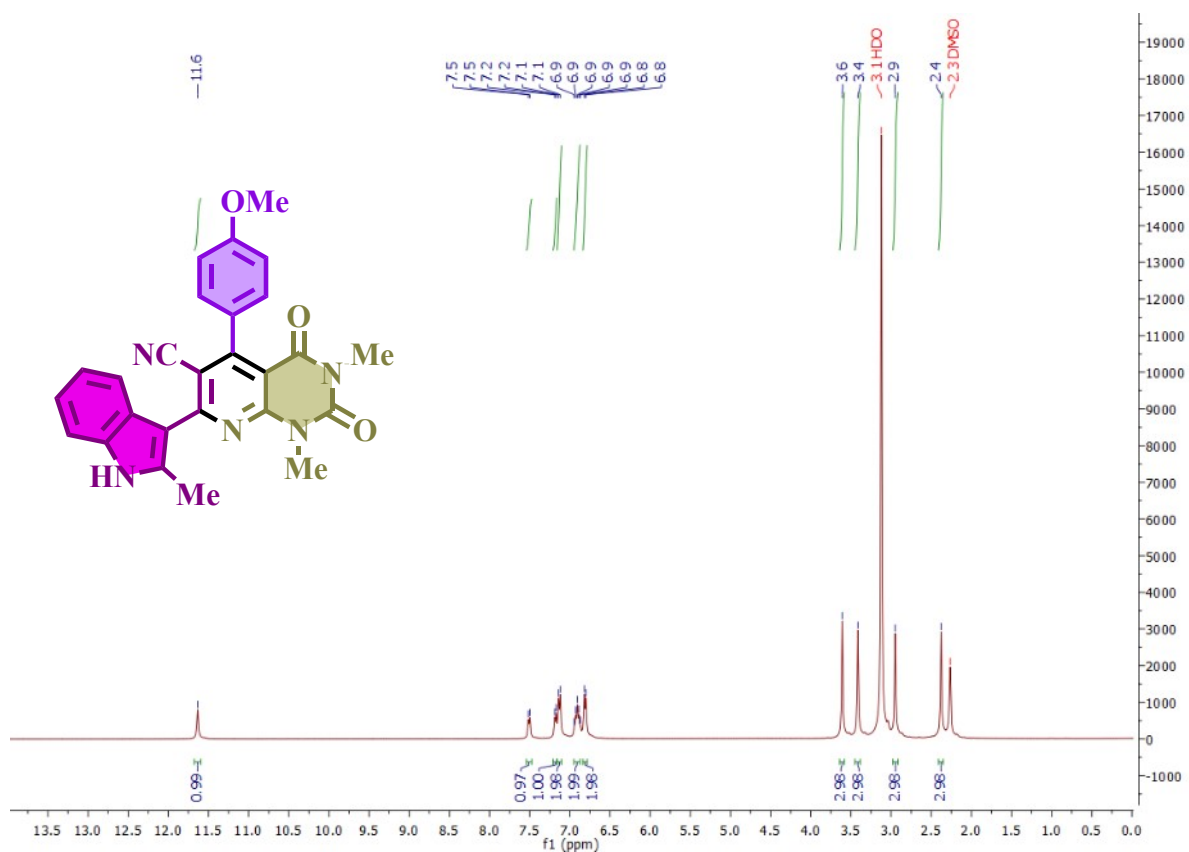
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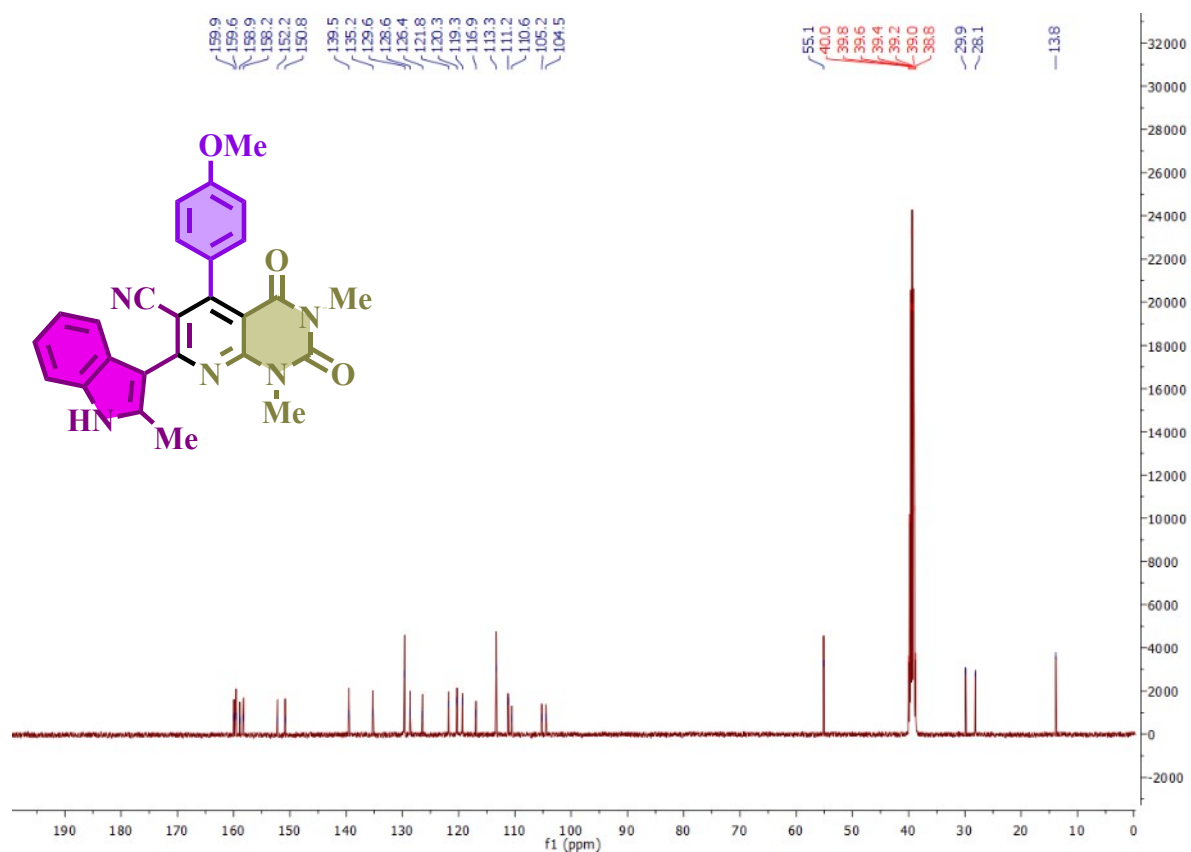
Mass spectrum of 5-(4-hydroxyphenyl)-1,3-dimethyl-7-(2-methyl-1H-indol-3-yl)-2,4-dioxo-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile (C2)



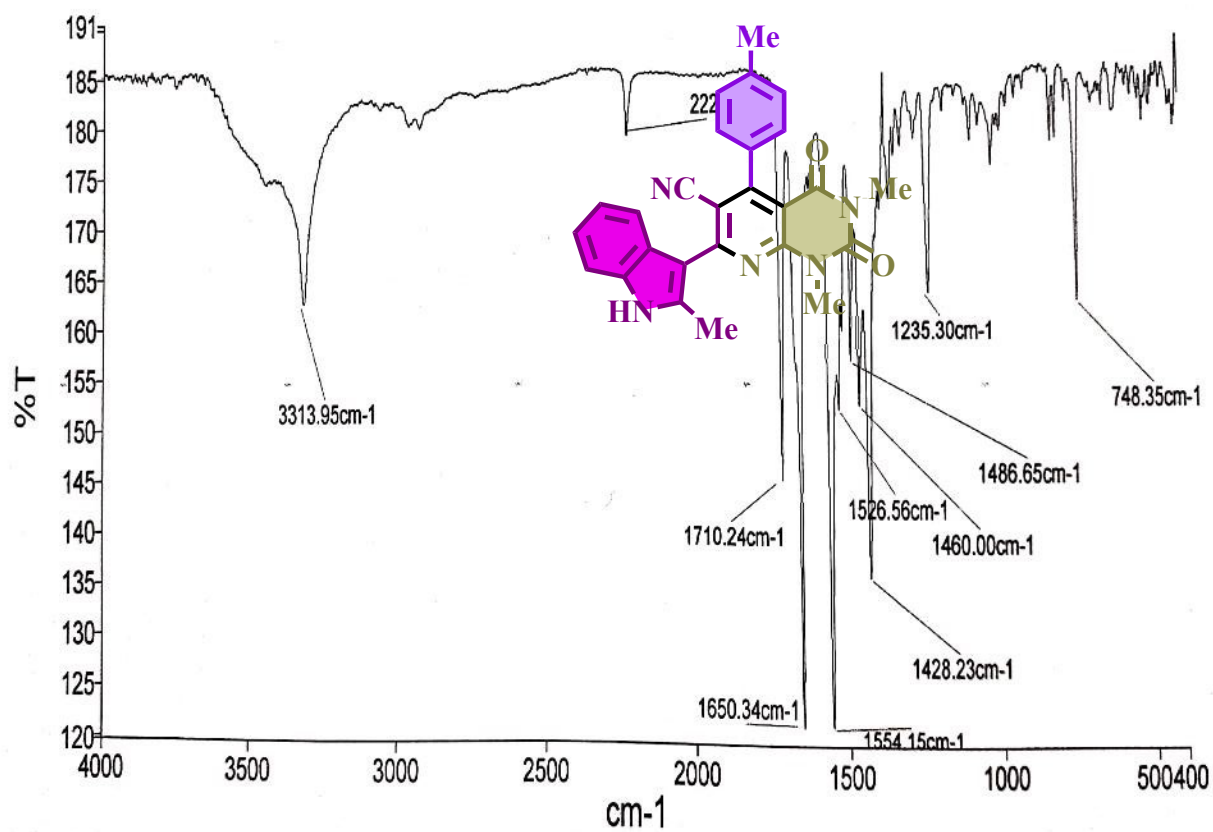
FT-IR spectrum of 5-(4-methoxyphenyl)-1,3-dimethyl-7-(2-methyl-1H-indol-3-yl)-2,4-dioxo-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile (C3)



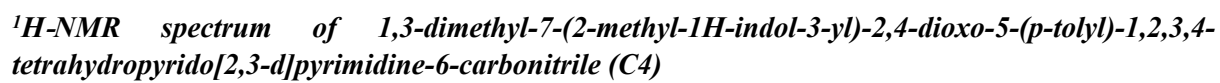
^1H -NMR spectrum of 5-(4-methoxyphenyl)-1,3-dimethyl-7-(2-methyl-1H-indol-3-yl)-2,4-dioxo-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile (C3)

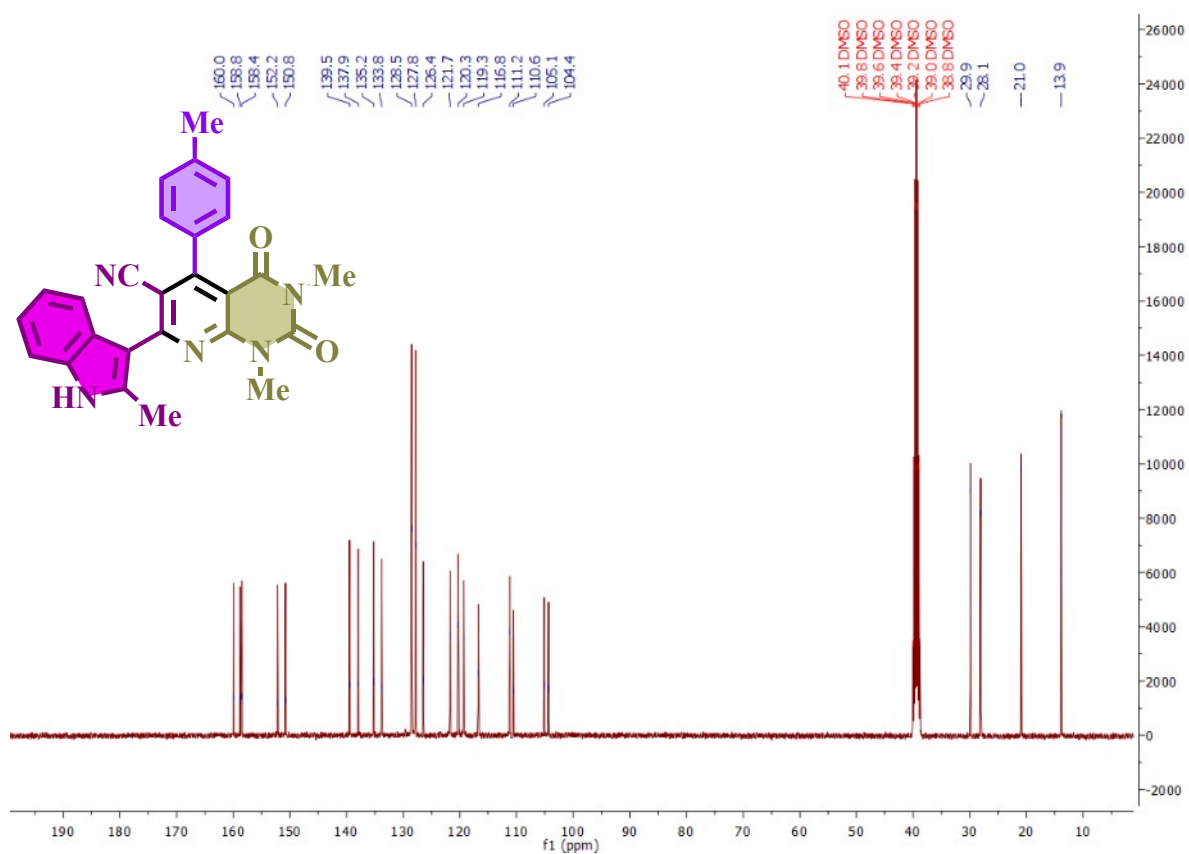


^{13}C -NMR spectrum of 5-(4-methoxyphenyl)-1,3-dimethyl-7-(2-methyl-1H-indol-3-yl)-2,4-dioxo-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile (C3)

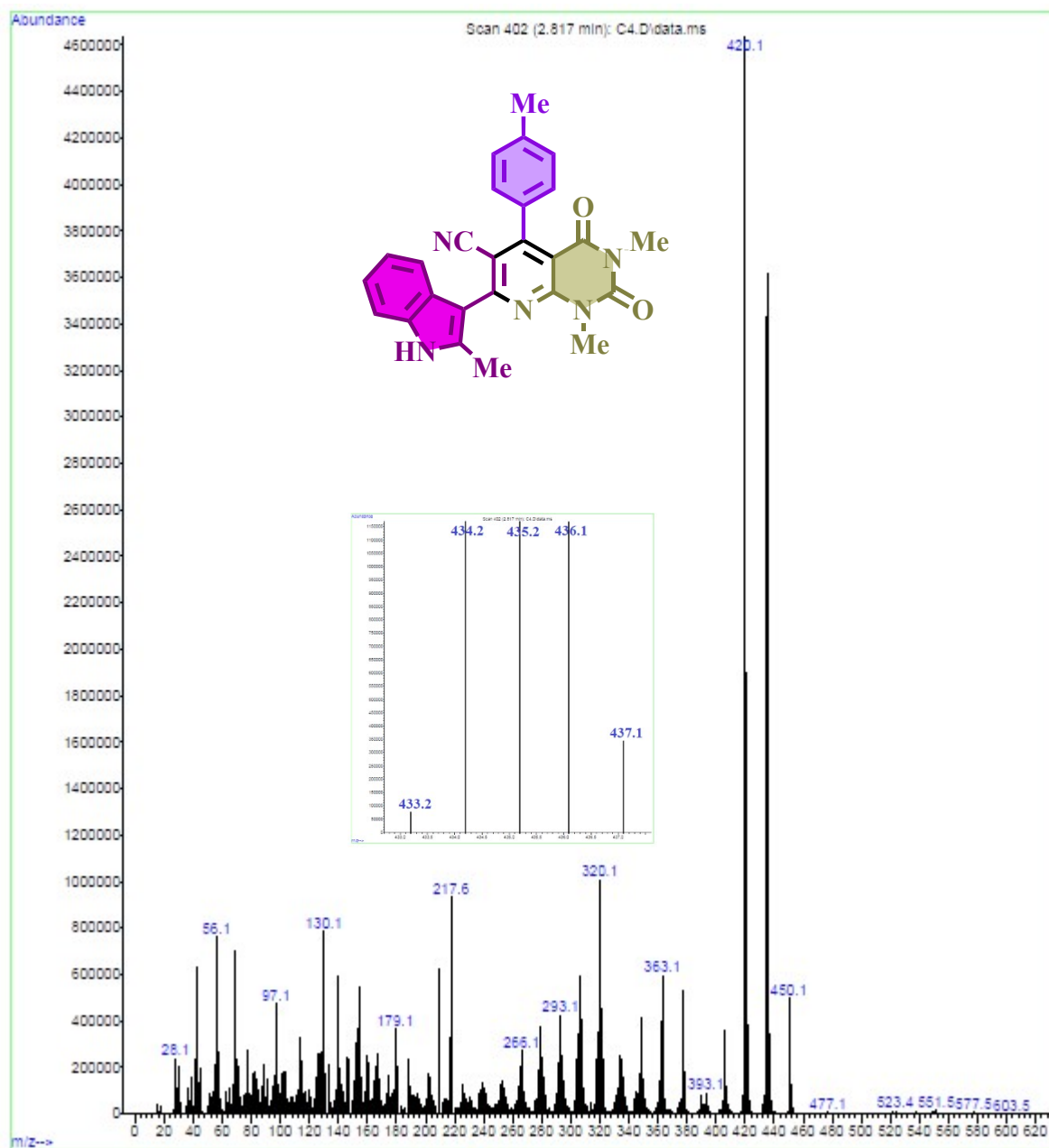


FT-IR spectrum of 1,3-dimethyl-7-(2-methyl-1H-indol-3-yl)-2,4-dioxo-5-(p-tolyl)-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile (C4)

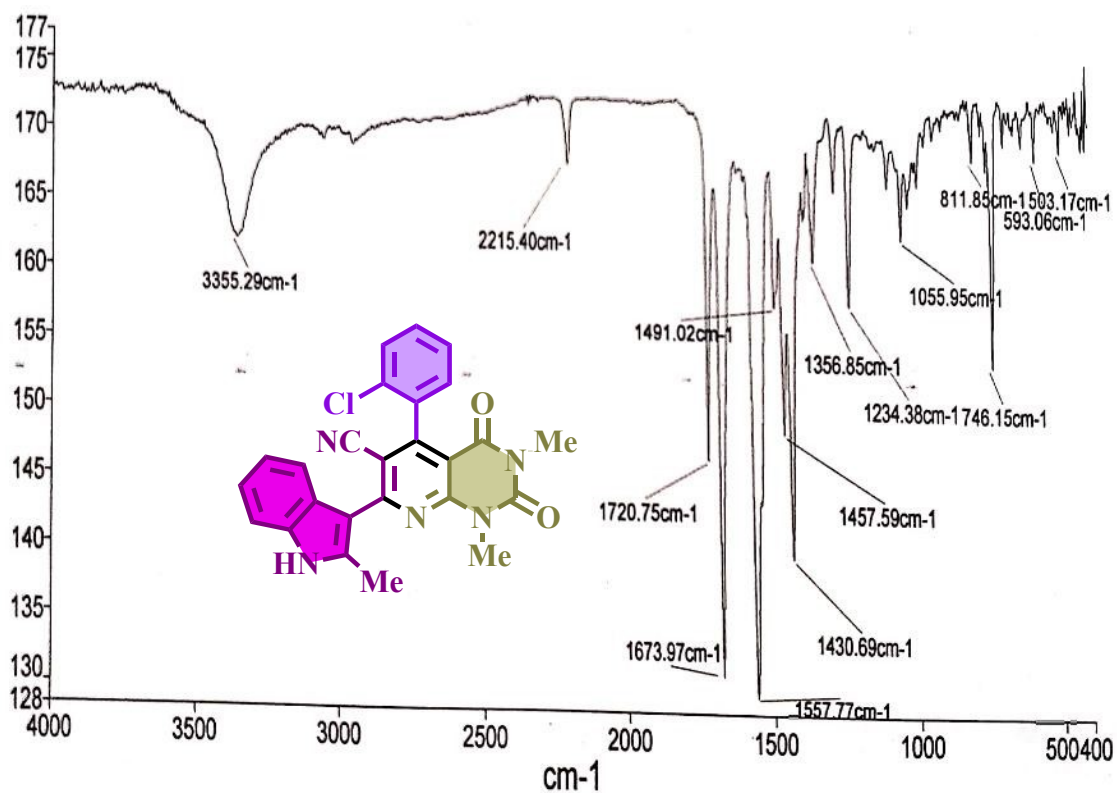




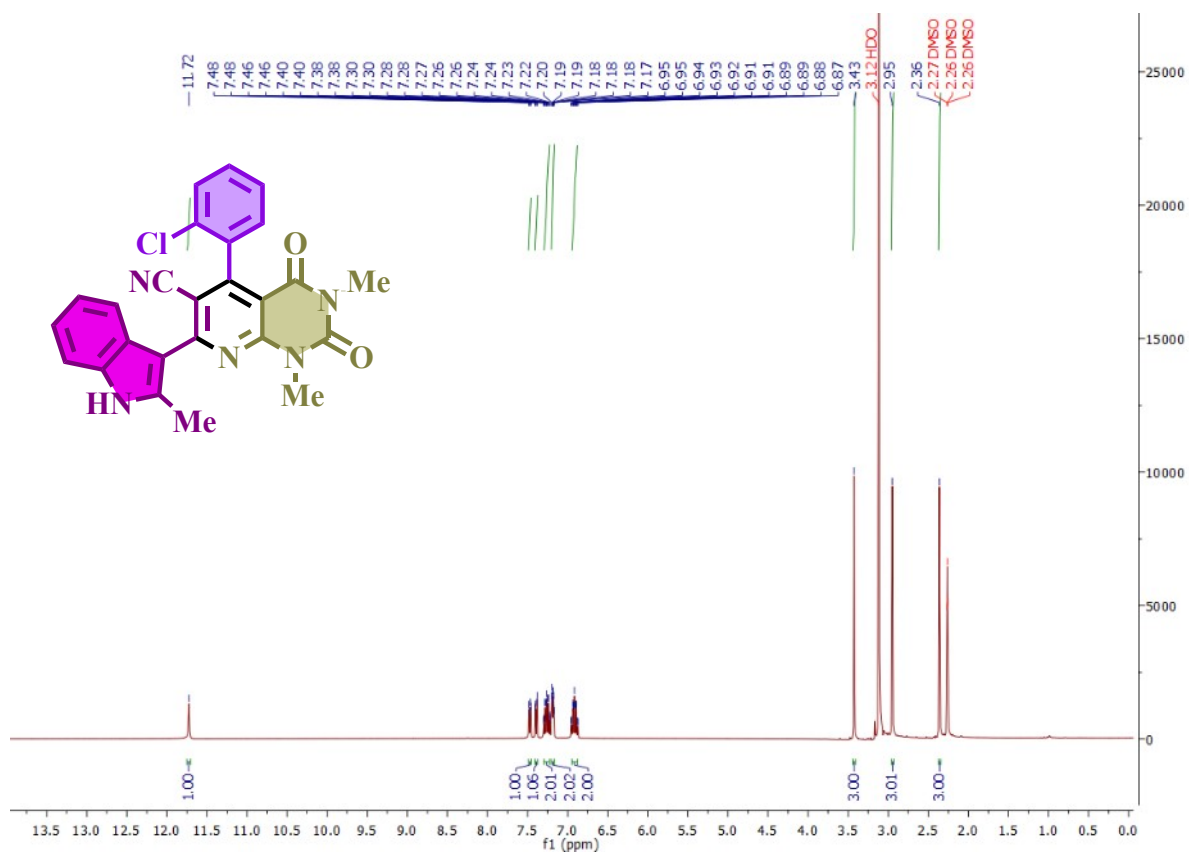
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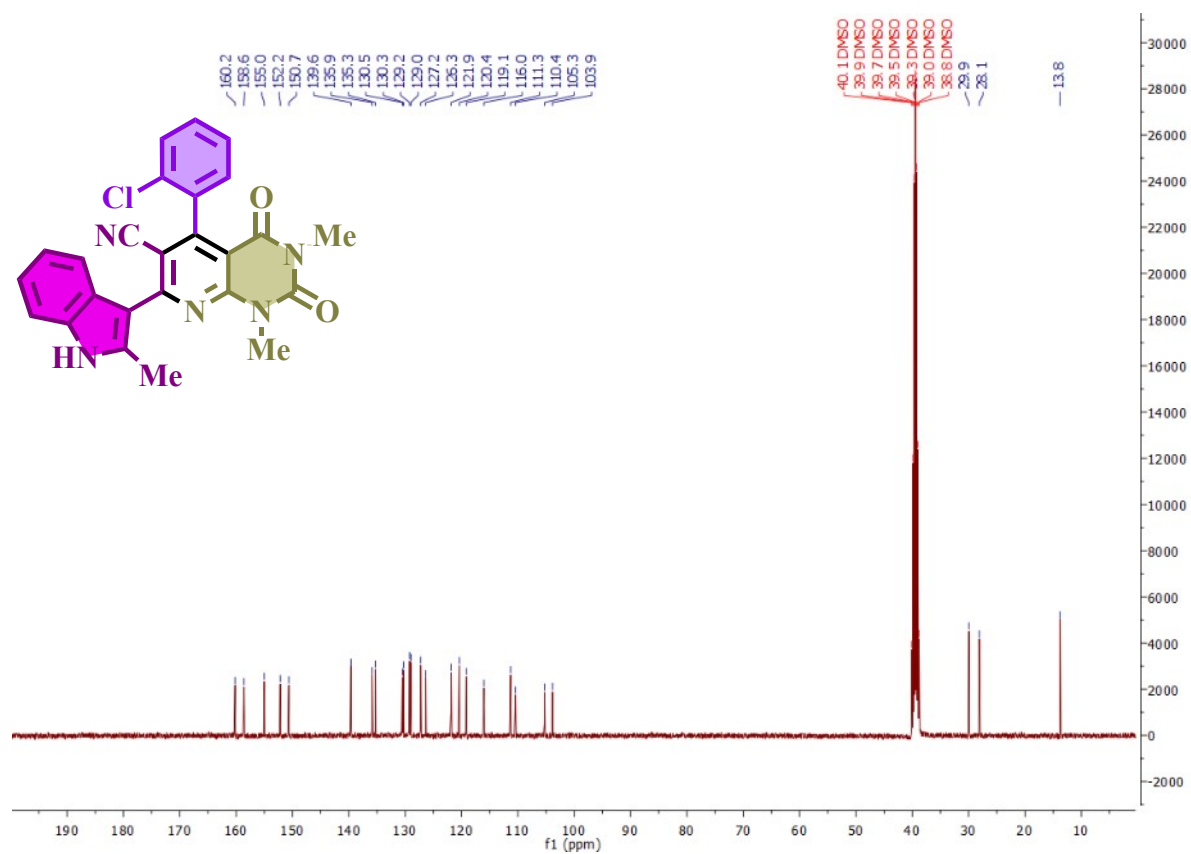
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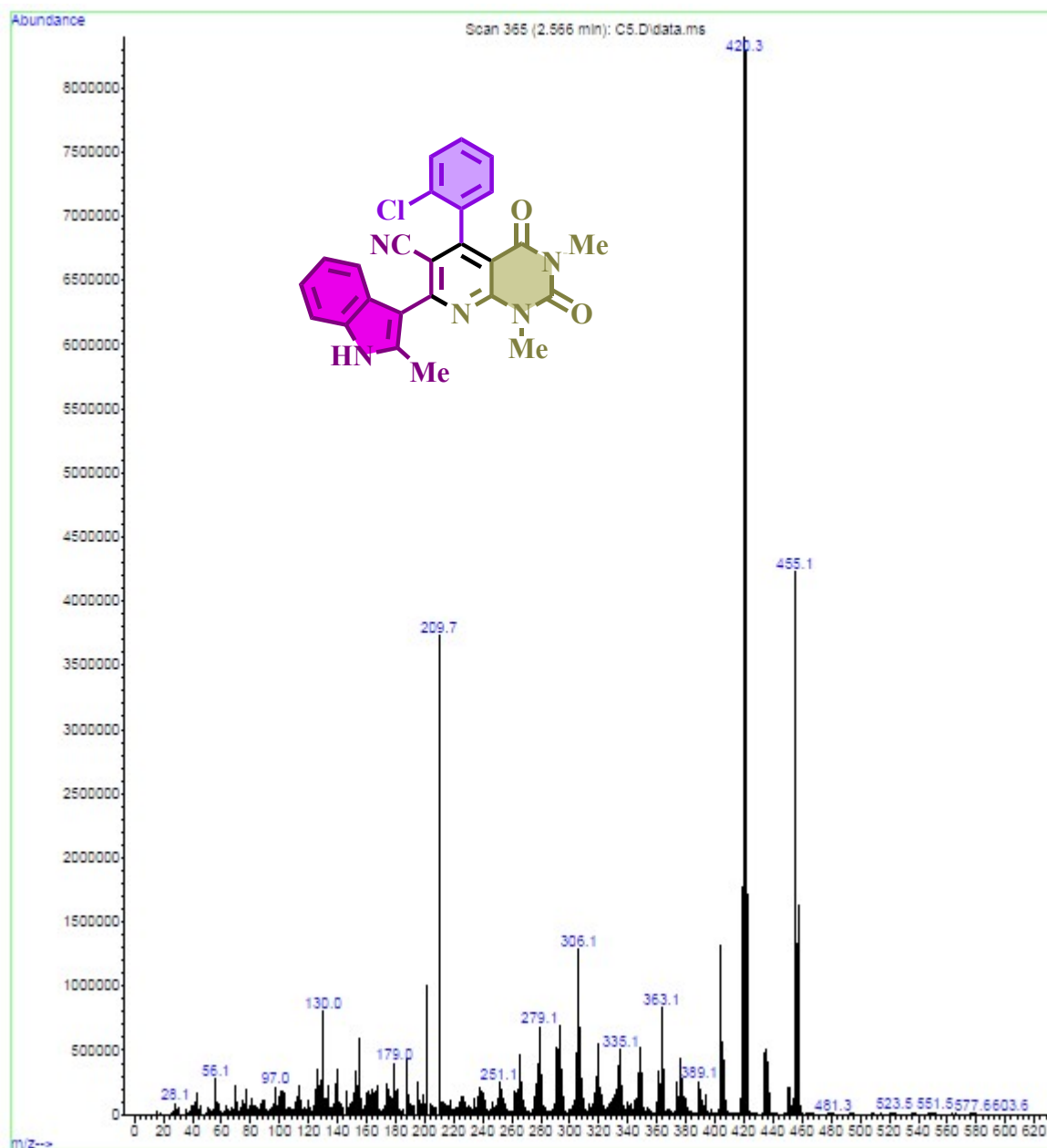
FT-IR spectrum of 5-(2-chlorophenyl)-7-(1H-indol-3-yl)-1,3-dimethyl-2,4-dioxo-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile (C5)



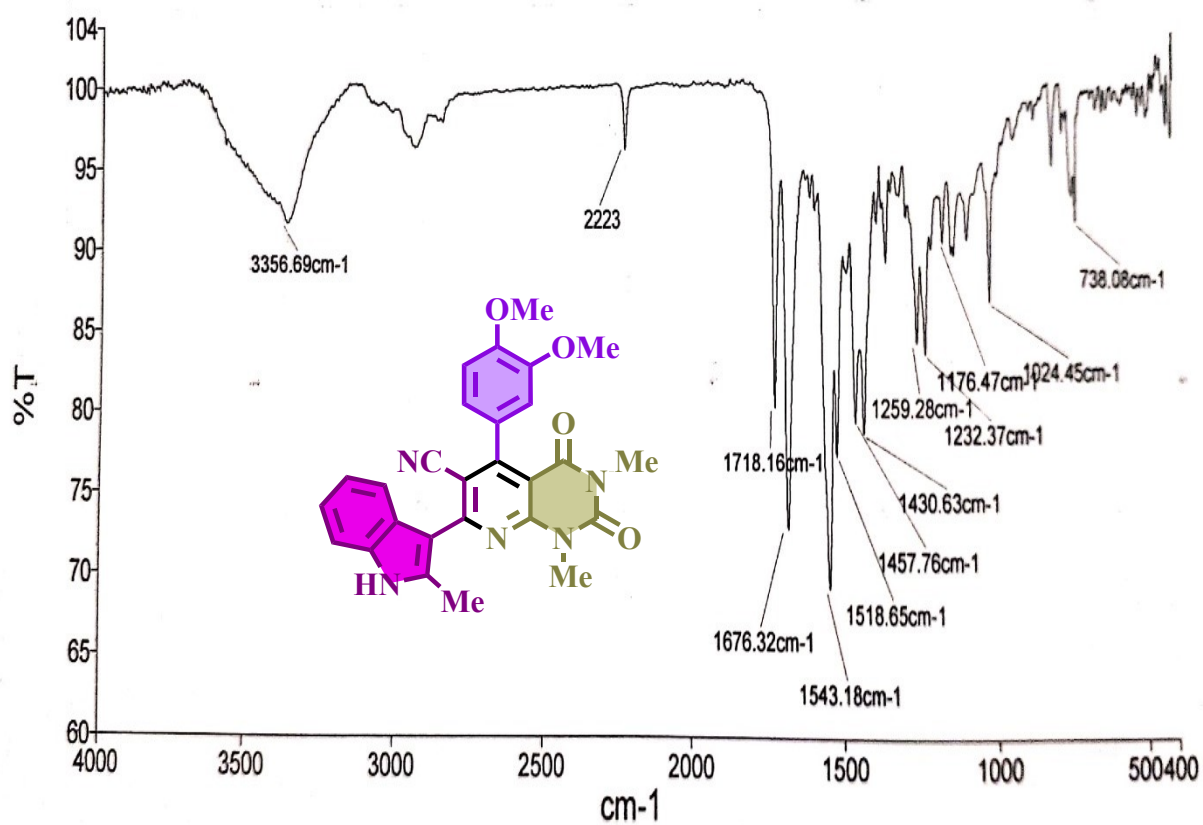
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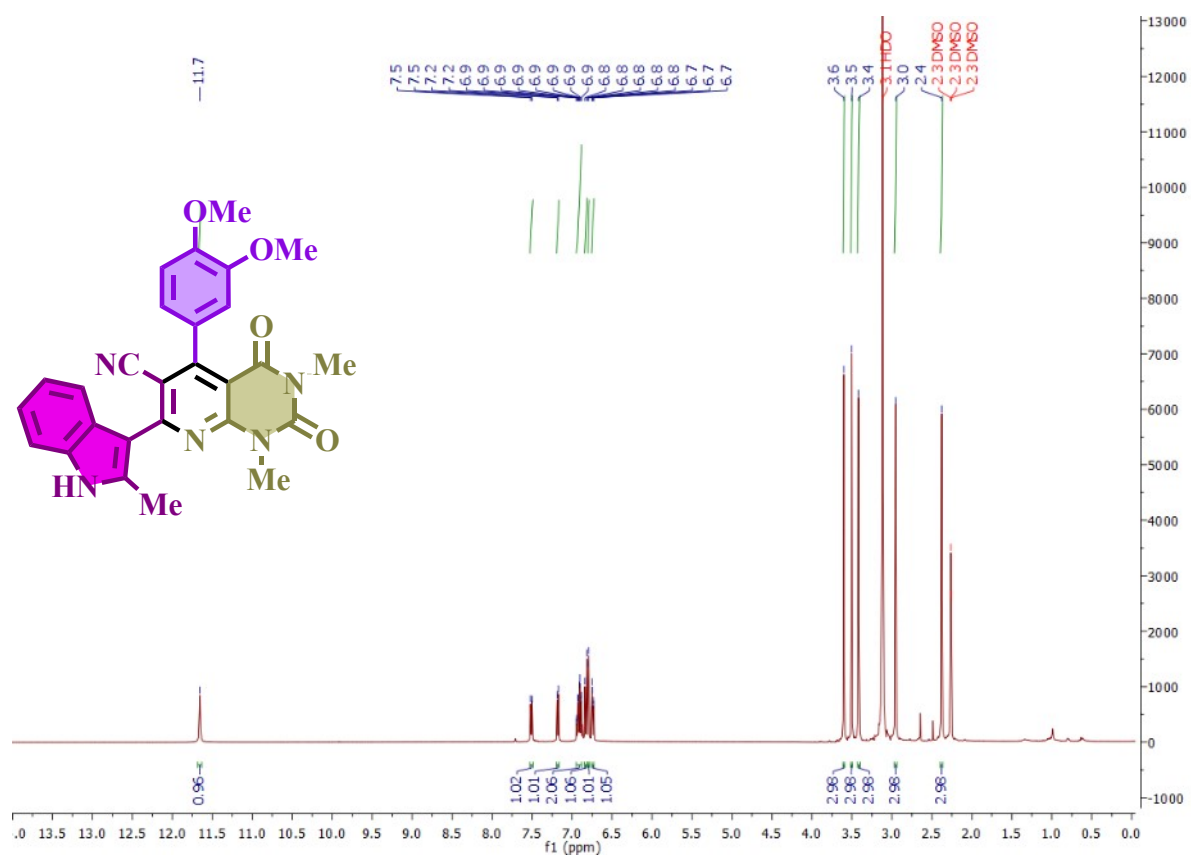
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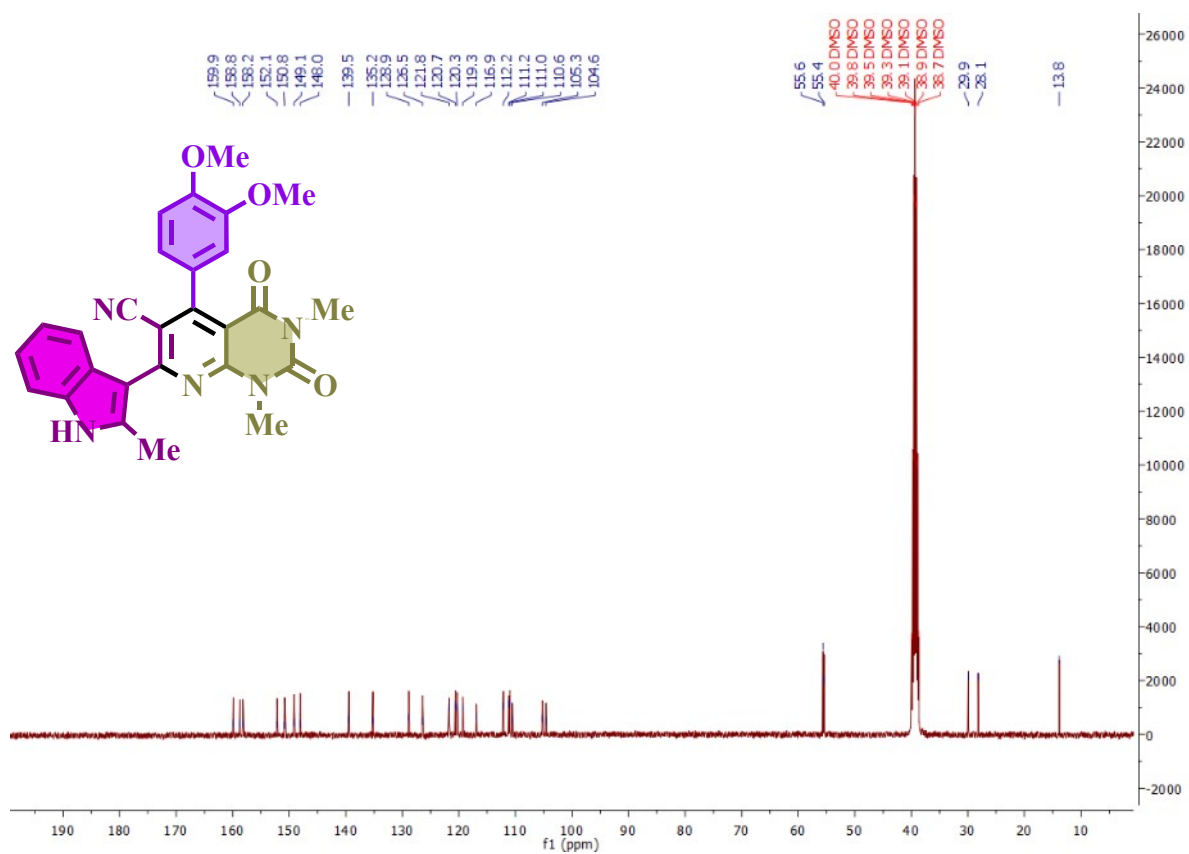
Mass spectrum of 5-(2-chlorophenyl)-7-(1H-indol-3-yl)-1,3-dimethyl-2,4-dioxo-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile (C5)



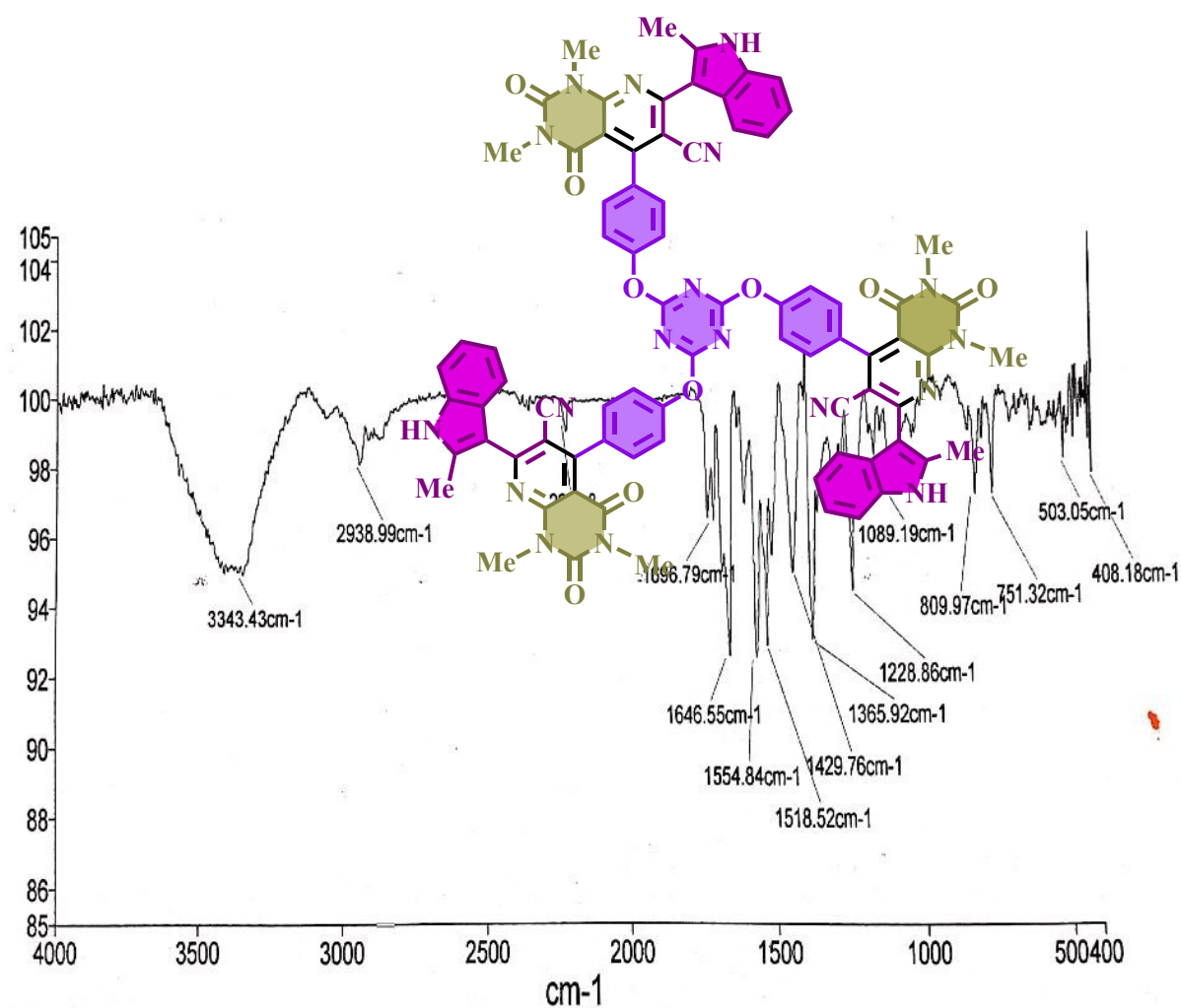
FT-IR spectrum of 5-(3,4-dimethoxyphenyl)-1,3-dimethyl-7-(2-methyl-1H-indol-3-yl)-2,4-dioxo-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile (C6)



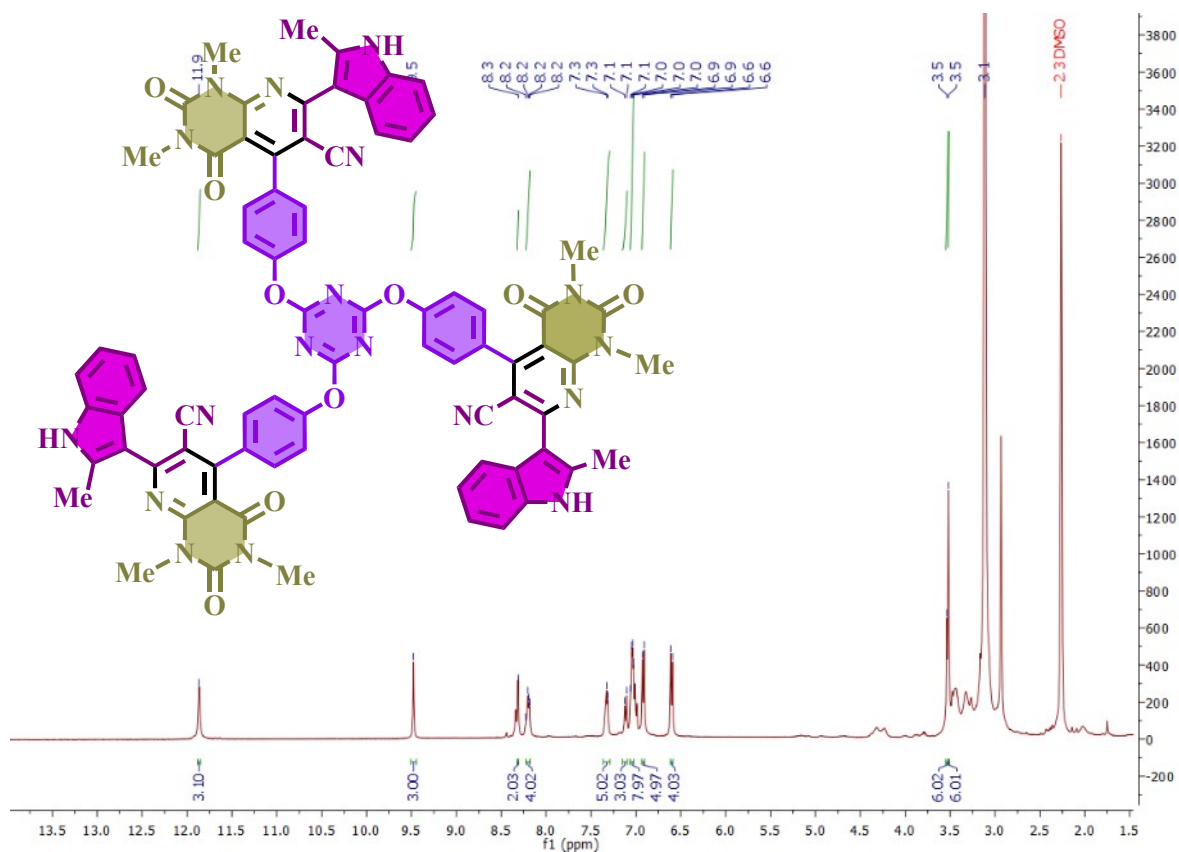
¹H-NMR spectrum of 5-(3,4-dimethoxyphenyl)-1,3-dimethyl-7-(2-methyl-1H-indol-3-yl)-2,4-dioxo-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile (C6)



^{13}C -NMR spectrum of 5-(3,4-dimethoxyphenyl)-1,3-dimethyl-7-(2-methyl-1H-indol-3-yl)-2,4-dioxo-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile (C6)



FT-IR spectrum of 5,5',5''-(((1,3,5-triazine-2,4,6-triyl)tris(oxy))tris(benzene-4,1-diyl))tris(7-(1H-indol-3-yl)-1,3-dimethyl-2,4-dioxo-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile) (C7)



¹H-NMR spectrum of 5,5',5''-(((1,3,5-triazine-2,4,6-triyl)tris(oxy))tris(benzene-4,1-diyl))tris(7-(1H-indol-3-yl)-1,3-dimethyl-2,4-dioxo-1,2,3,4-tetrahydropyrido[2,3-d]pyrimidine-6-carbonitrile) (C7)

