

Supplementary Information

FeVO₄ nanoparticles: Powering synergistic hetero-Fenton photodegradation of methyl violet and enabling green chemical synthesis

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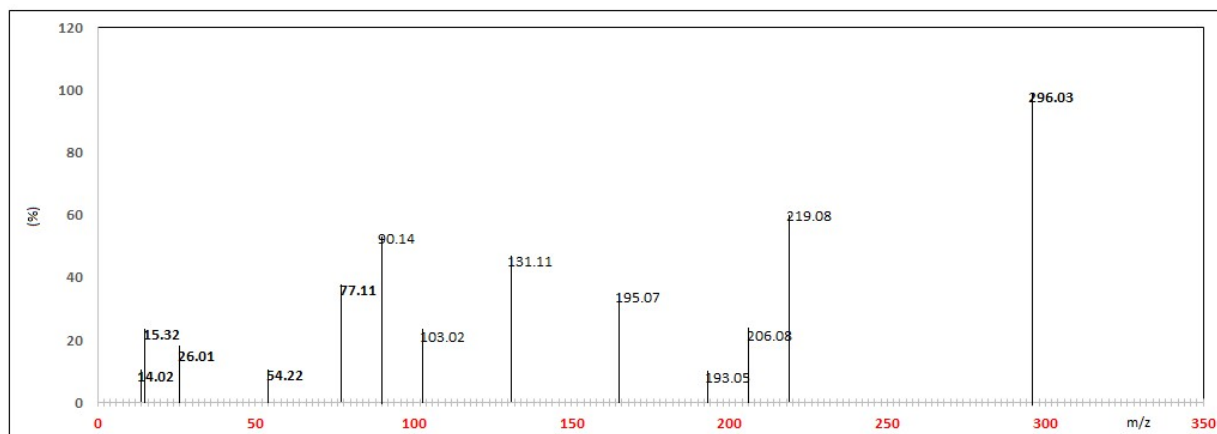
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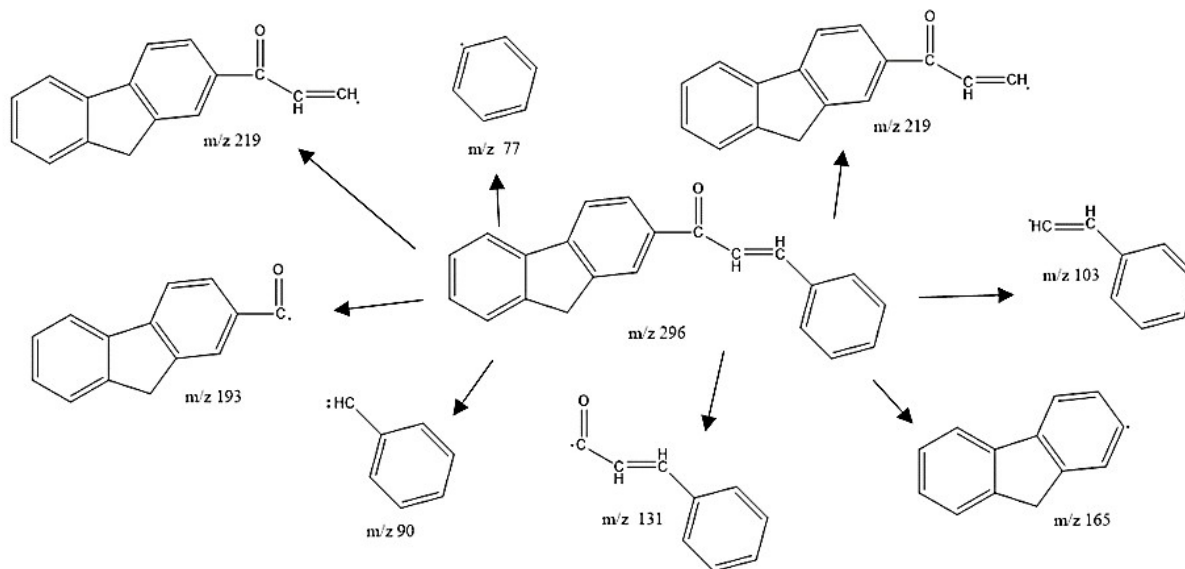
Spectroscopic data of synthesised compounds

Enones

2. (2E)-Styryl 9H-fluorenyl ketone: IR (ν , cm^{-1}): 2981(CH), 1607(CO s-cis), 1598(COs-trans), 1165(CH_{ip}), 1045($\text{CH}=\text{CH}_{\text{op}}$), 726($\text{C}=\text{CH}_{\text{op}}$), 534($\text{C}=\text{C}_{\text{op}}$). ^1H NMR (400 MHz, δ , ppm): 7.575 (d, 1H, H_α), 7.898 (d, 1H, H_β), 6.234-8.124(m, 7H, Ar-H), 4.232(d, 2H, CH_2). ^{13}C NMR (125 MHz, δ , ppm): 123(C_α), 142.01(C_β), 48.23 (CH_2), 206.03(CO), 121.43-148.34(Ar-C). Mass (m/z)= 296[M^+], 219, 206, 193, 165, 131, 103, 90, 77, 54, 26, 15, 14.



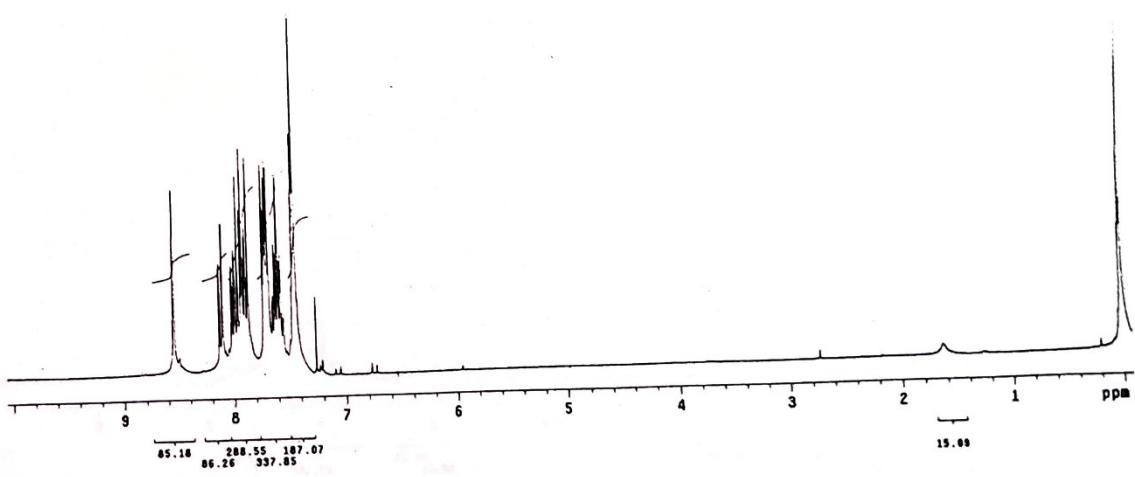
Mass spectra of (2E)-Styryl 9H-fluorenyl ketone (**2**)



Assigned mass fragments of (2E)-Styryl 9H-fluorenyl ketone (2)

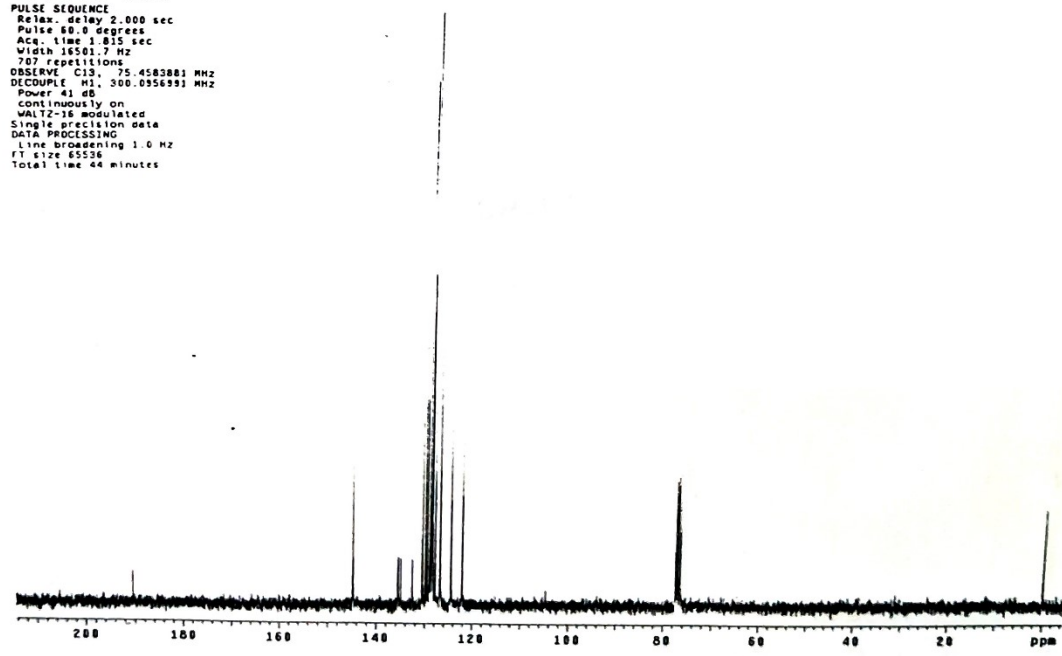
3. (2E)-Styryl 2-naphthyl ketone: IR (ν , cm^{-1}): 3010(CH), 1664(CO s-cis), 1668(COs-trans), 1174(CH_{ip}), 1063($\text{CH}=\text{CH}_{\text{op}}$), 754($\text{C}=\text{CH}_{\text{op}}$), 510($\text{C}=\text{C}_{\text{op}}$). ^1H NMR (400 MHz, δ , ppm): 7.993 (d, 1H, H_α), 8.148 (d, 1H, H_β), 7.264-8.561(m, 12H, Ar-H). ^{13}C NMR (125 MHz, δ , ppm): 122.33(C_α), 142.45(C_β), 185.42(CO), 121.92-145.71(Ar-C). Mass (m/z) = 258[M^+], 181, 168, 155, 131, 121, 103, 90, 77, 54, 28, 26, 15, 14, 13.

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Pulse 39.2 degree
Acq. time 3.744 sec
Width 4000.0 Hz
32 repetitions
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F1 size 32758
Total time 3 minutes

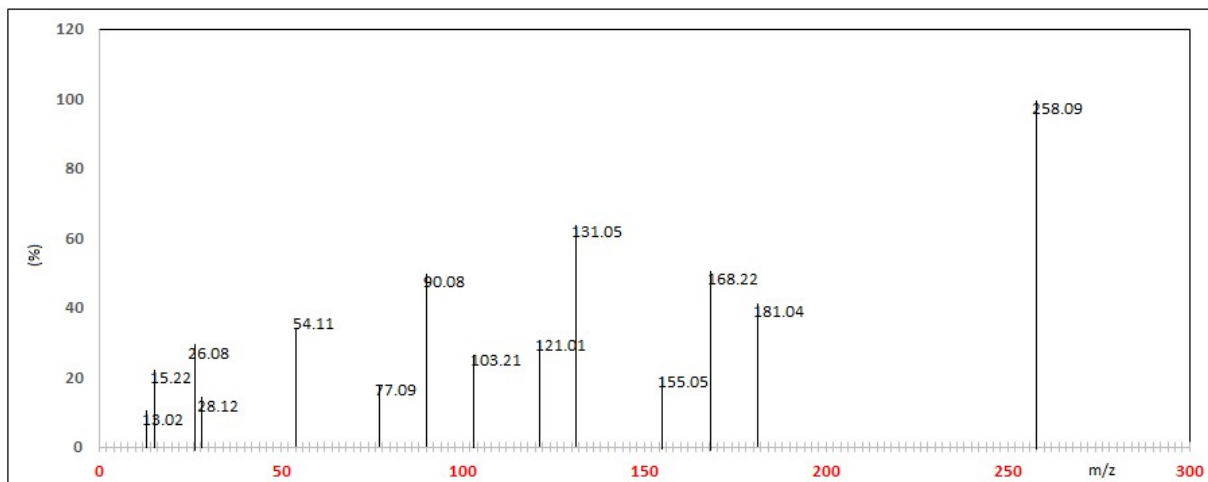


¹H NMR spectra of (2E)-Styryl 2-naphthyl ketone (3).

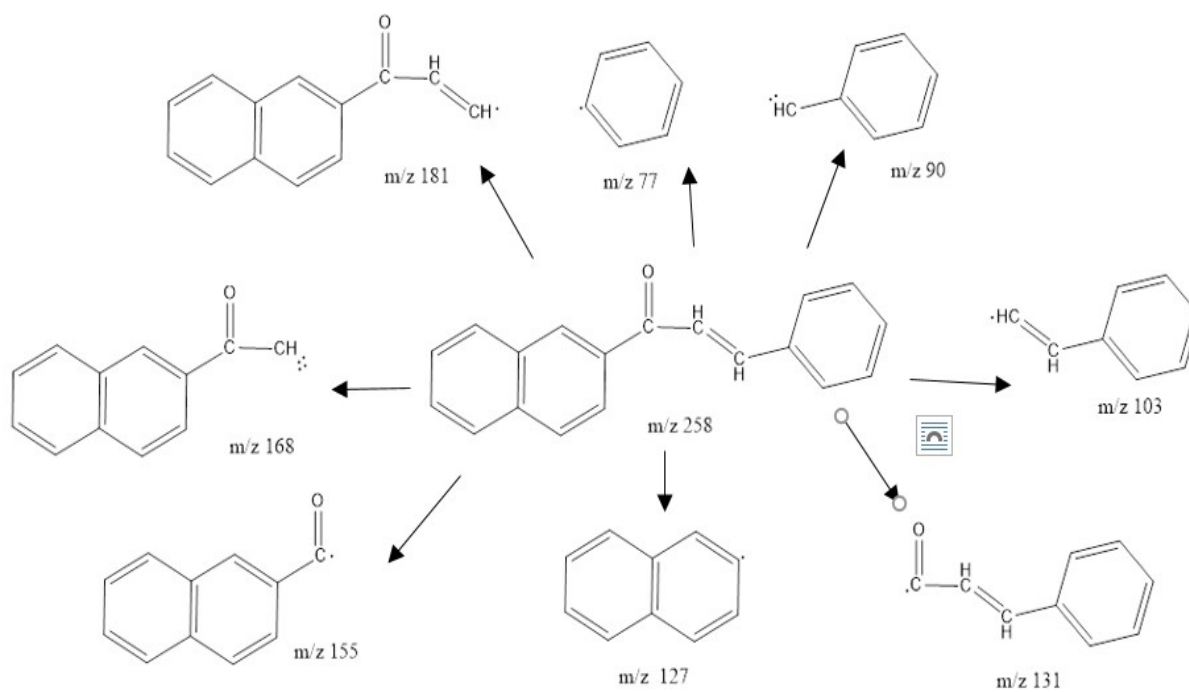
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707 repetitions
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DECOUPLE H1, 300.0356391 MHz
Power 41 dB
continuously on
WALTZ-16 modulated
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¹³C NMR spectra of (2E)-Styryl 2-naphthyl ketone (3).

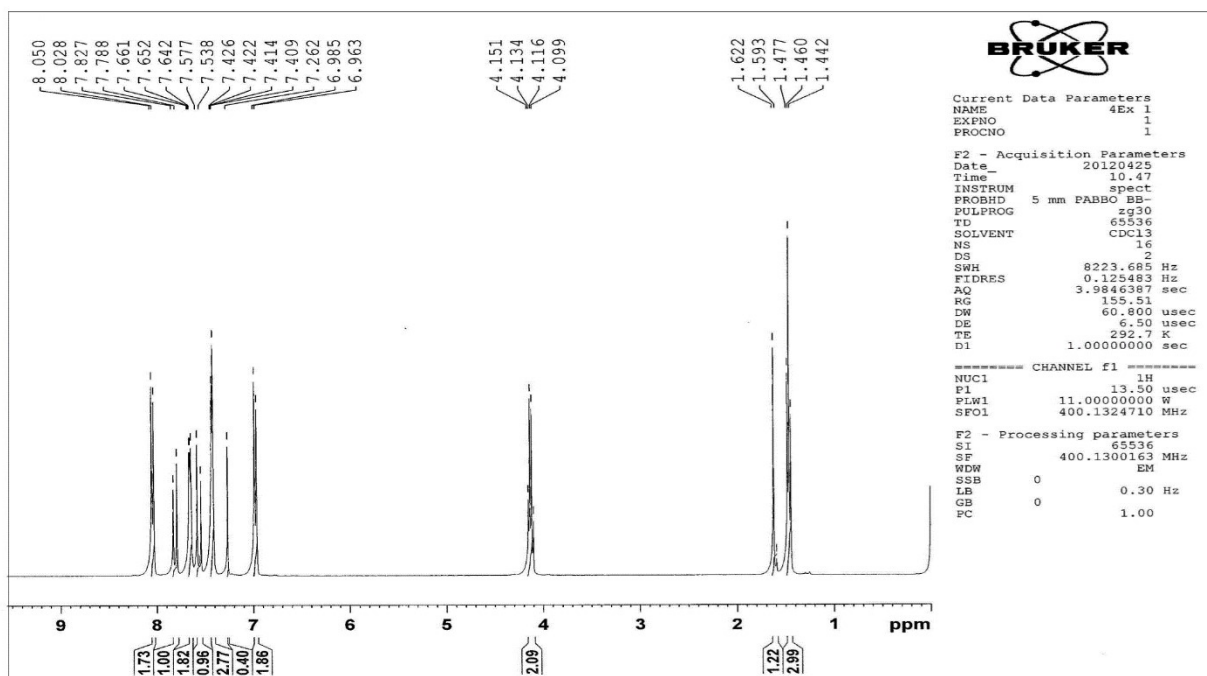


Mass spectra of (2E)-Styryl 2-naphthyl ketone (3).

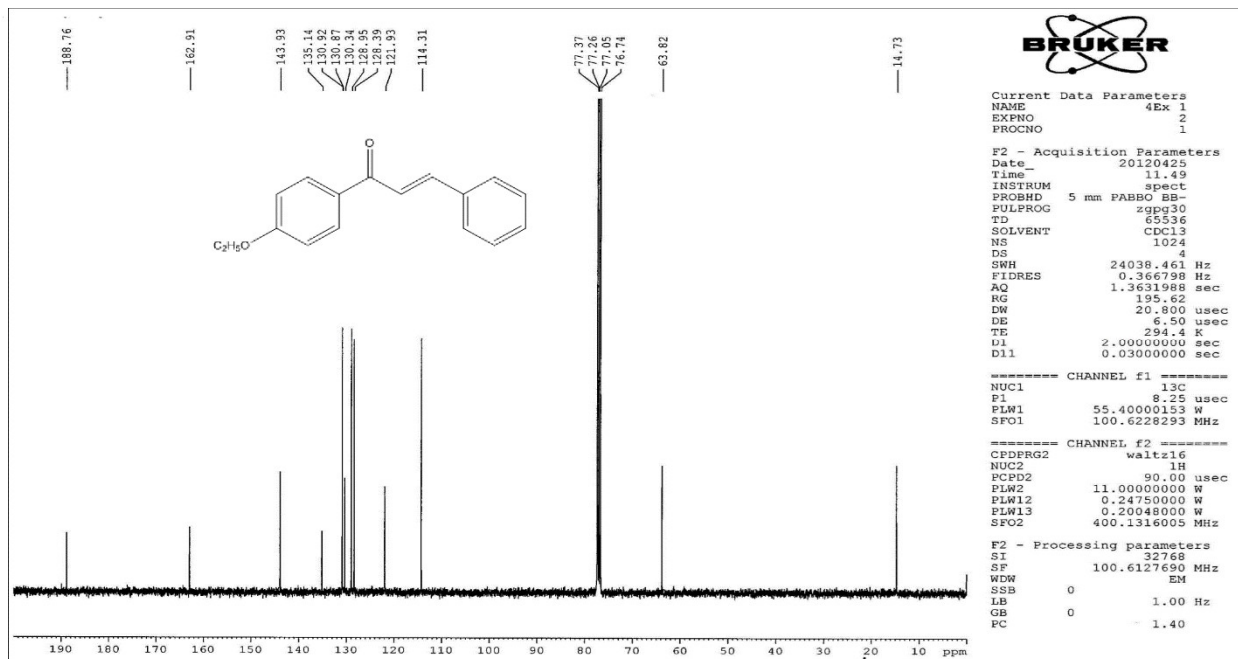


Assigned mass spectral fragments of (2E)-Styryl 2-naphthyl ketone (3).

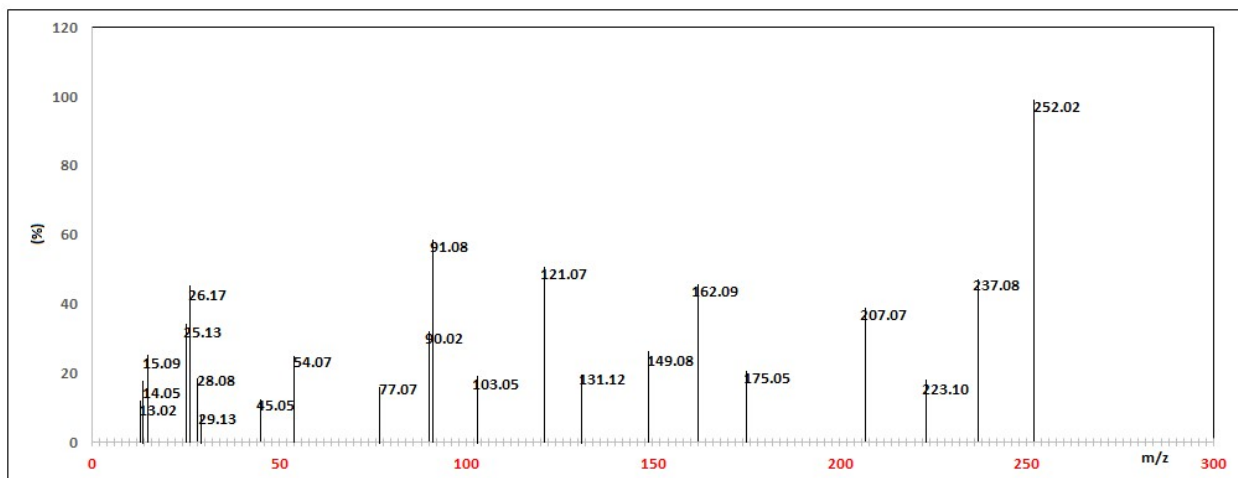
6. (2E)-Styryl 4-ethoxyphenyl ketone: IR (ν , cm^{-1}): 2998(CH), 1656(CO s-cis), 1602(CO s-trans), 1189(CH_{ip}), 1049($\text{CH}=\text{CH}_{\text{op}}$), 763($\text{C}=\text{CH}_{\text{op}}$), 566($\text{C}=\text{C}_{\text{op}}$). ^1H NMR (400 MHz, δ , ppm): 7.555 (d, 1H, H_α), 7.806 (d, 1H, H_β), 1.442-1.662 (t, 2H, CH_2), 4.099-4.151(q, 3H, CH_3), 6.963-8.051(m, 9H, Ar-H),. ^{13}C NMR (125 MHz, δ , ppm): 121.93(C_α), 143.91(C_β), 188.76(CO), 63.92 (CH_2), 14.73(CH_3) 114.31-162.91(Ar-C). Mass (m/z) = 252 $[\text{M}^+]$, 237, 223, 207, 175, 162, 149, 131, 121, 103, 91, 90, 77, 54, 45, 29, 28, 26, 25, 15, 14, 13.



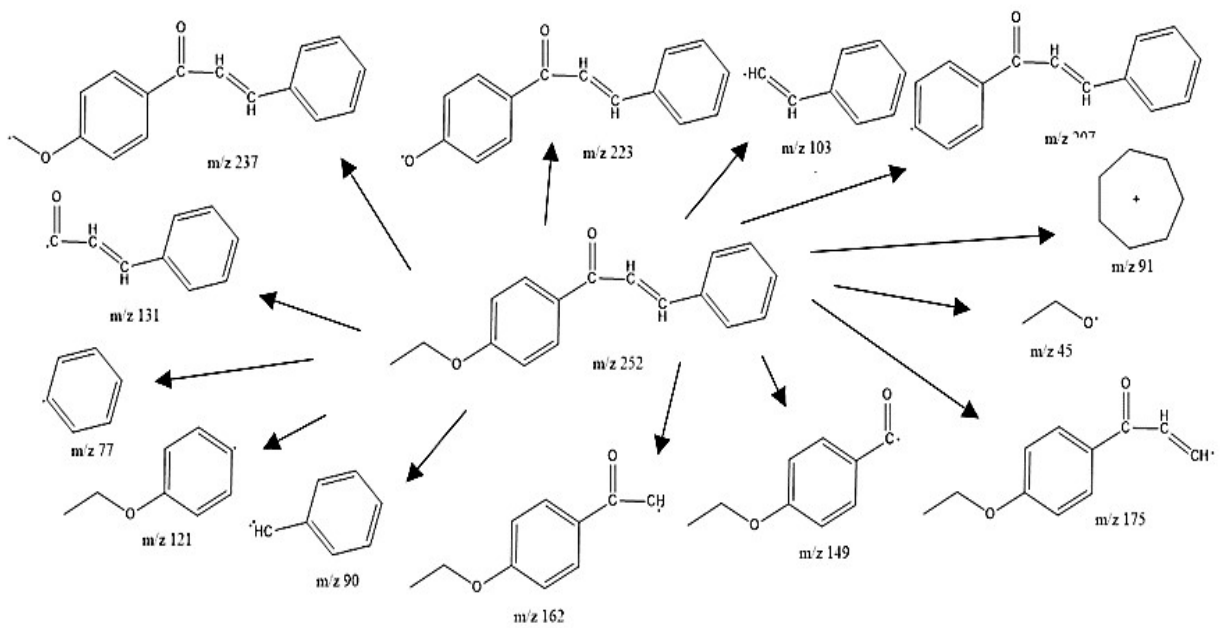
^1H NMR spectra of (2E)-Styryl 4-ethoxyphenyl ketone (6)



^{13}C NMR spectra of (2E)-Styryl 4-ethoxyphenyl ketone (6)



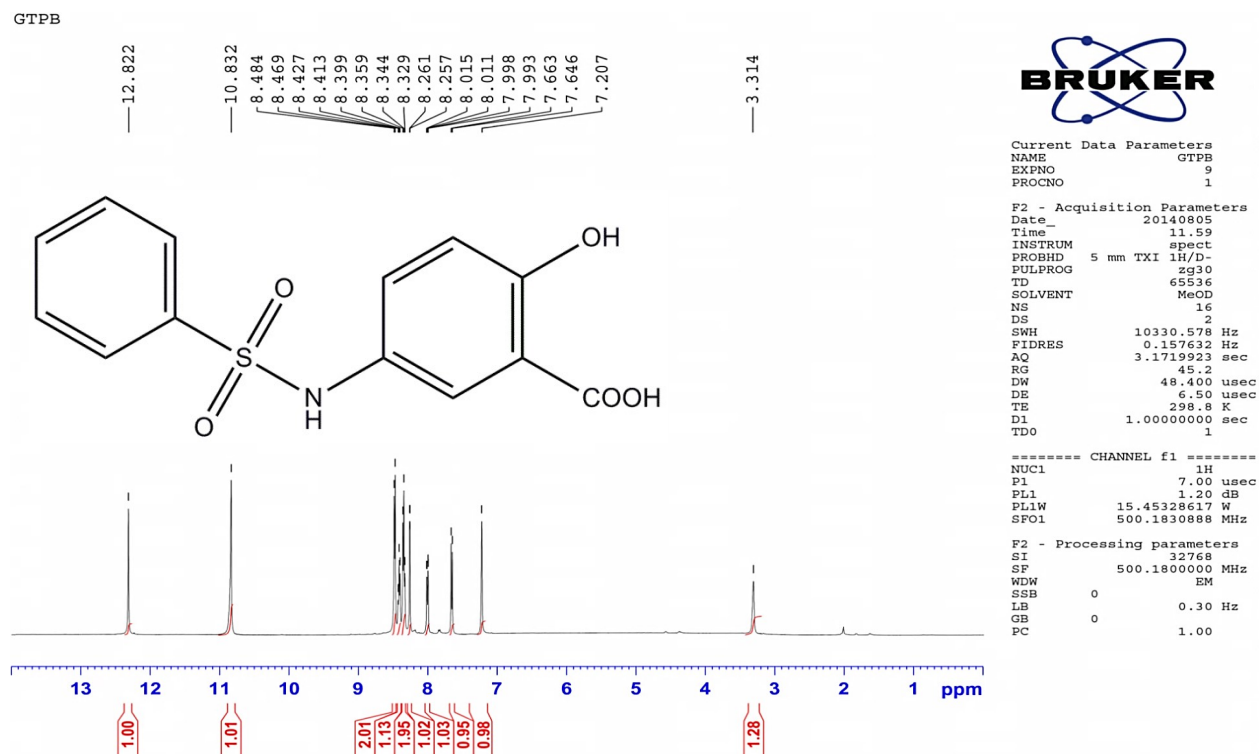
Mass spectra of (2E)-Styryl 4-ethoxyphenyl ketone (6)



Assigned mass spectral fragments of $(2E)$ -Styryl 4-ethoxyphenyl ketone (**6**)

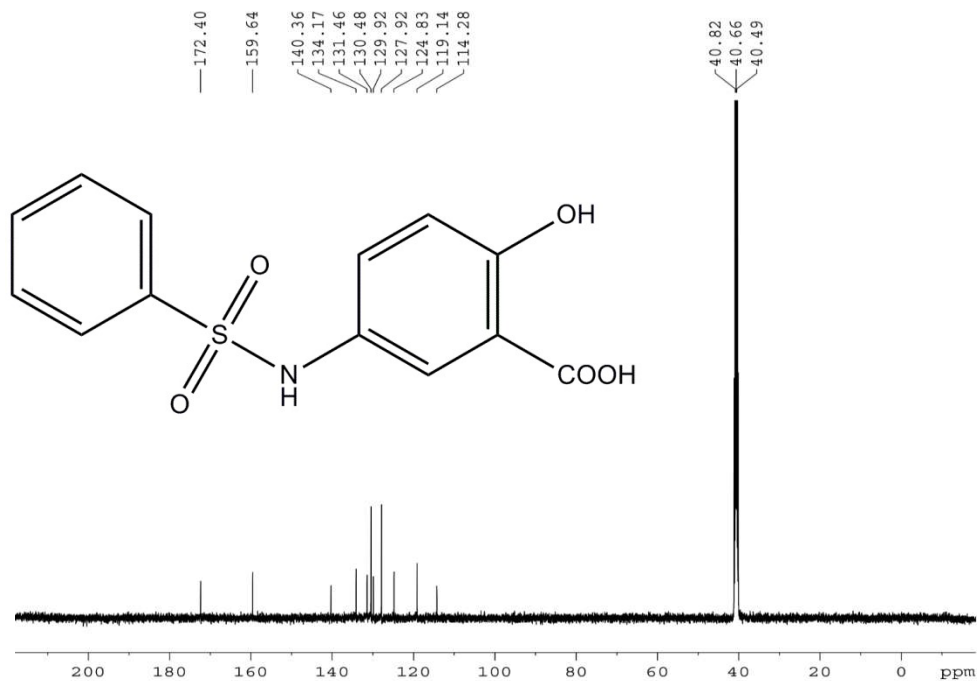
Sulfonamides

1. **2-Hydroxy-5-(phenylsulfonamido)benzoic acid** : IR (ν , cm^{-1}): 3262(NH), 1695(CO), 1311(SO sym), 1158 (SO asym). ^1H NMR (400 MHz, δ , ppm): 10.832 (s, 1H, NH), 3.314 (s, 1H, OH), 12.822 (s, 2H, COOH), 7.207-8.484(m, 8H, Ar-H). ^{13}C NMR (125 MHz, δ , ppm): 172.90 (CO), 159.64 (C-N), 114.28-140.36(Ar-C). Mass (m/z) = 293[M^+], 276, 156, 142, 141, 137, 77, 55, 45, 17, 15.

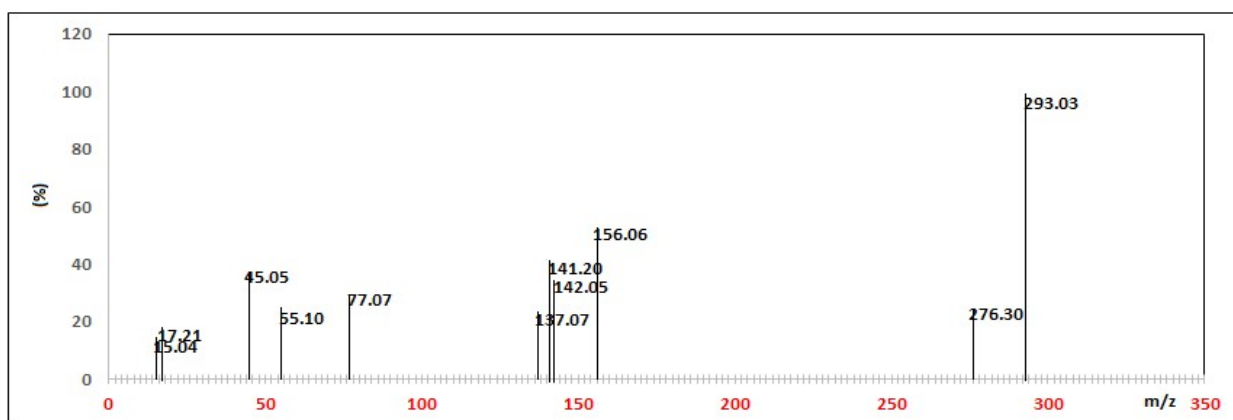


^1H NMR spectrum of 2-hydroxy-5-(phenylsulfonamido)benzoic acid (**1**)

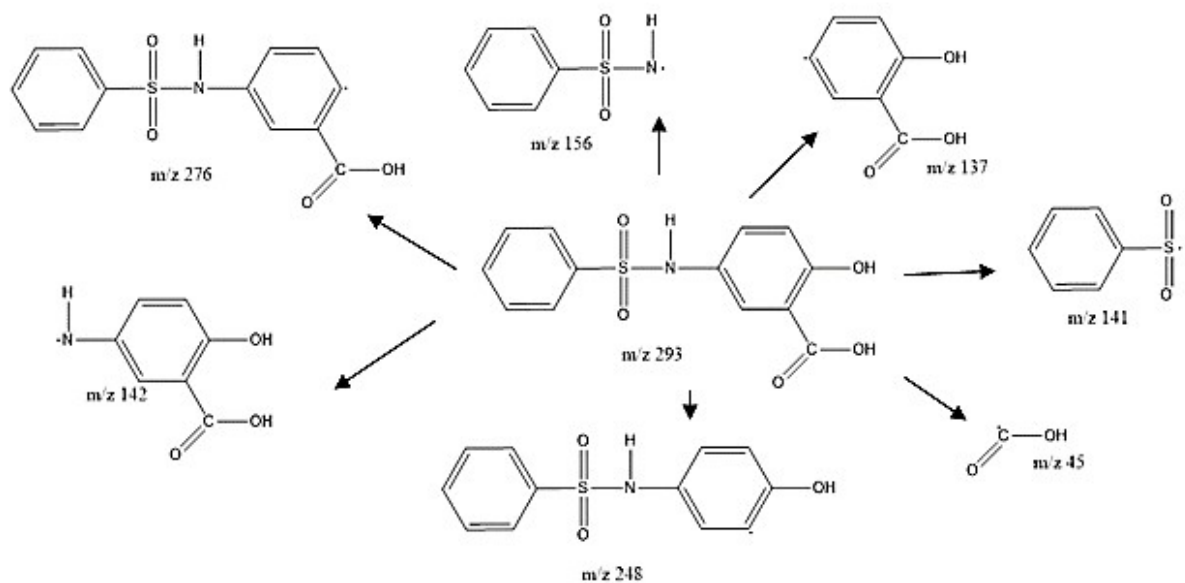
GTPB



¹³C NMR spectrum of 2-hydroxy-5-(phenylsulfonamido)benzoic acid (1)

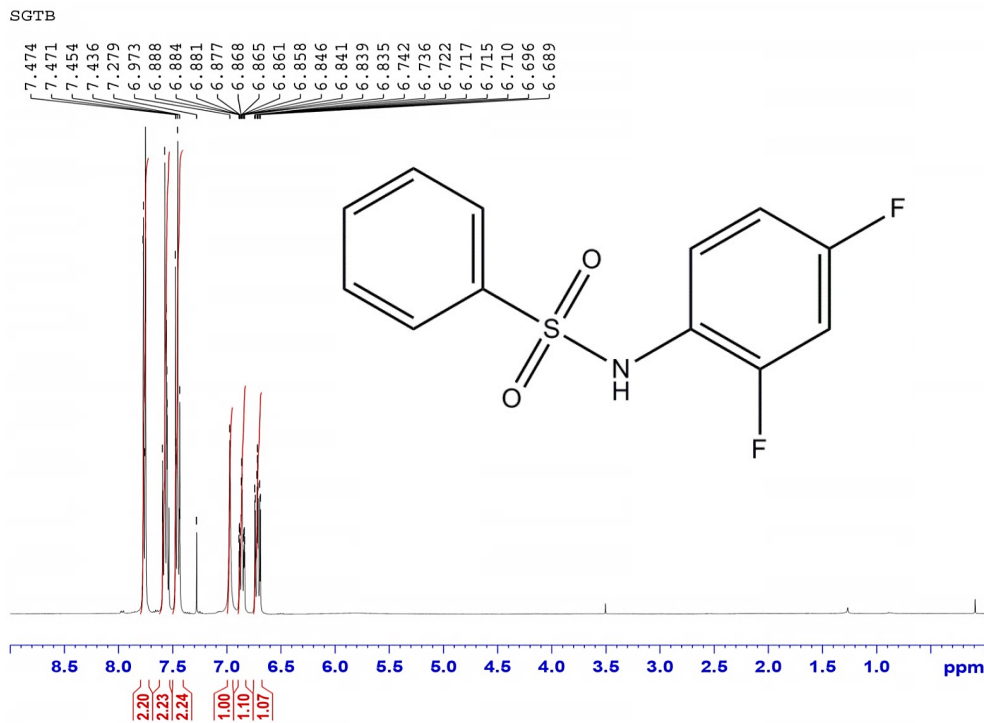


Mass spectrum of 2-hydroxy-5-(phenylsulfonamido)benzoic acid (1)



Assigned spectral fragments of 2-hydroxy-5-(phenylsulfonamido)benzoic acid (1)

5. *N*-(2,4-difluorophenyl)benzenesulfonamide: IR (ν , cm^{-1}): 3240(NH), 1334(SO sym), 1159 (SO asym). ^1H NMR (400 MHz, δ , ppm): 6.972 (s, 1H, NH), 6.689-7.747(m, 8H, Ar-H). ^{13}C NMR (125 MHz, δ , ppm): 159.28 (C-N), 137.09 (C-F), 104.04-161.87(Ar-C). Mass (m/z) = 273[M^{+4}], 271[M^{+2}], 269[M^{+}], 250, 192, 156, 141, 128, 113, 77, 64, 19, 15.



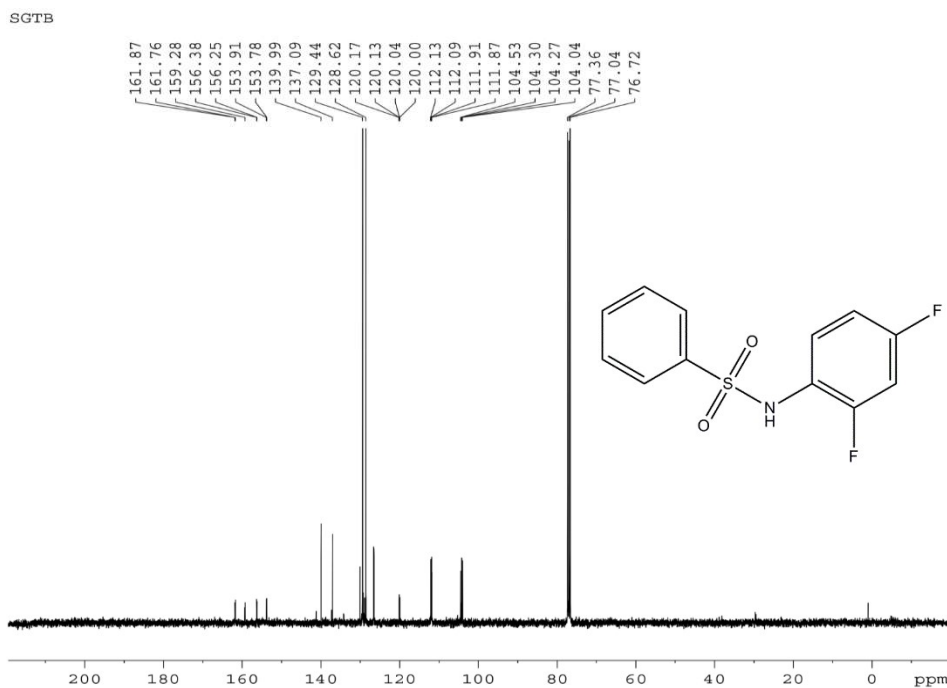
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¹H NMR spectrum of *N*-(2,4-difluorophenyl)benzenesulfonamide (5)



Current Data Parameters
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 EXPNO 2
 PROCNO 1

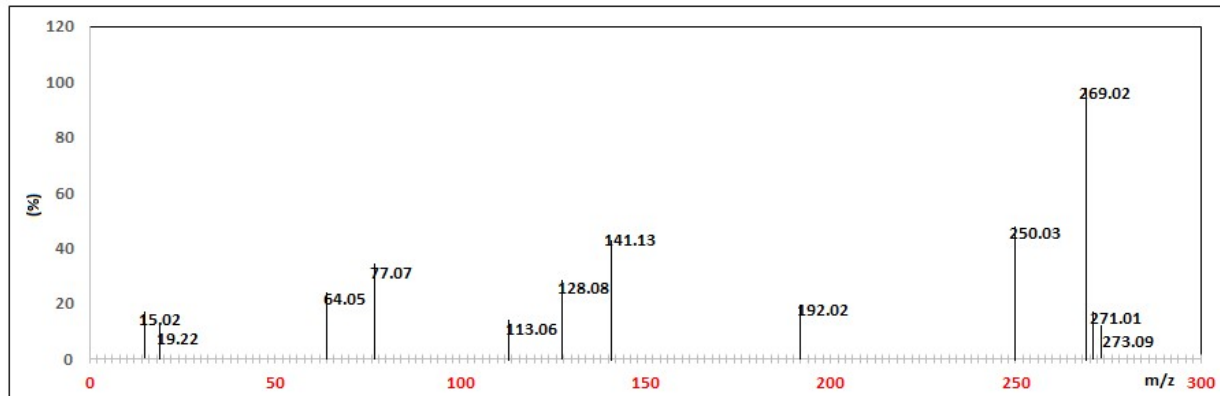
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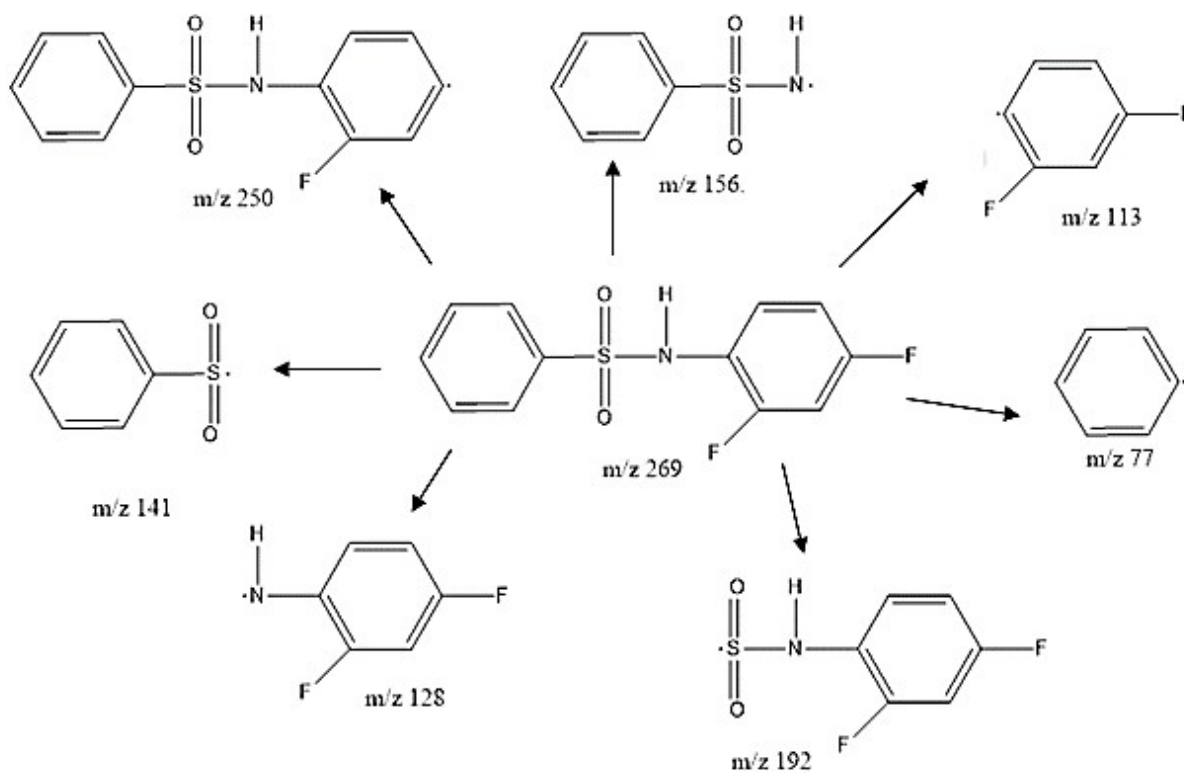
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¹³C NMR spectrum of *N*-(2,4-difluorophenyl)benzenesulfonamide (5)



Mass spectrum of N-(2,4-difluorophenyl)benzenesulfonamide (**5**)



Assigned mass spectral fragments of N-(2,4-difluorophenyl)benzenesulfonamide (**5**)