

## SUPPLEMENTARY MATERIALS

*Article*

# Diatom Biosilica Doped with Palladium(II) Chloride Nanoparticles as New Efficient Photocatalysts for Methyl Orange Degradation

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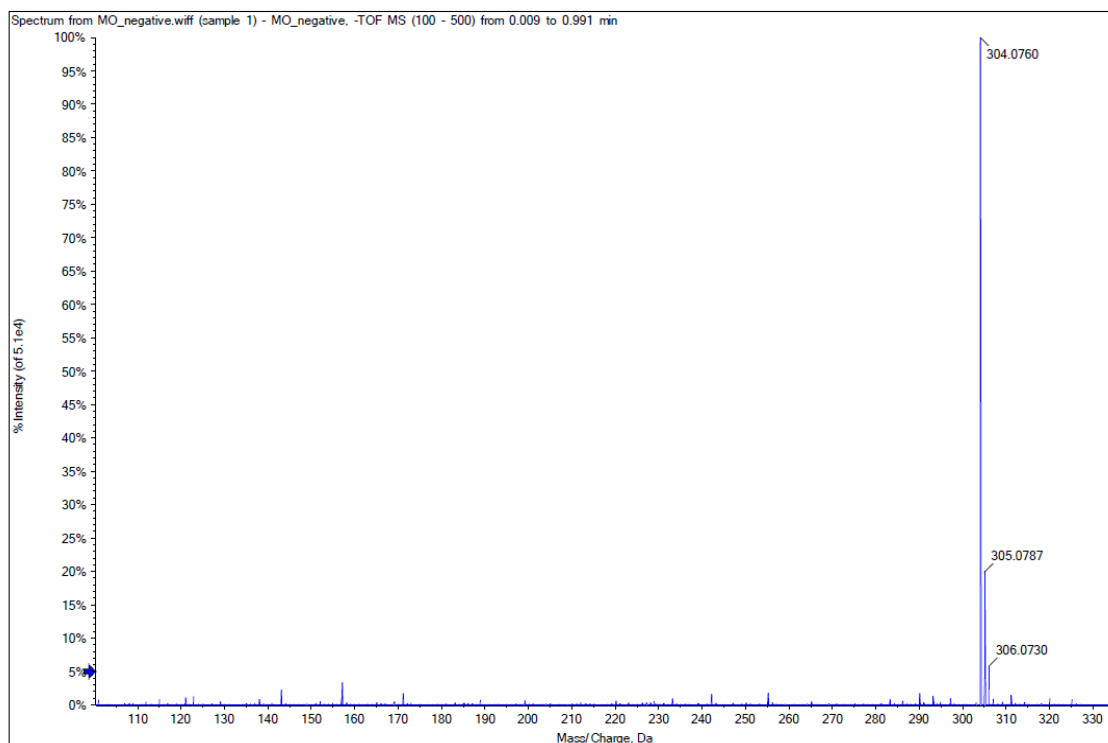
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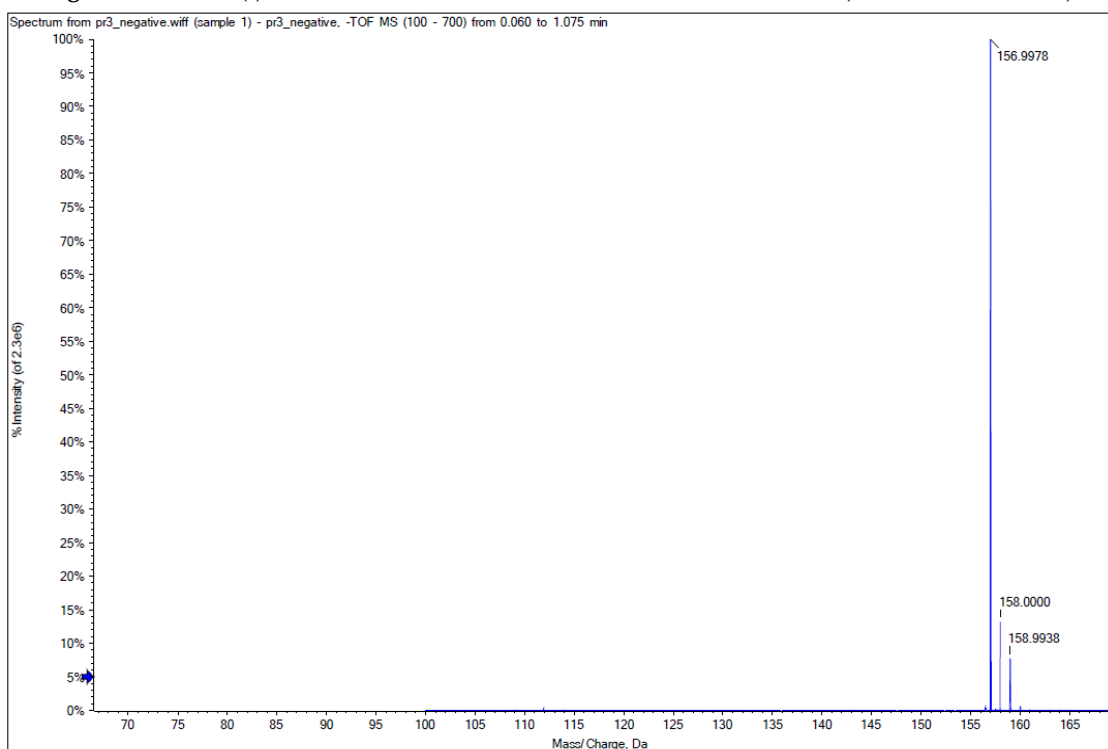
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The mass spectra and compound confirmation for the degradation products of MO.

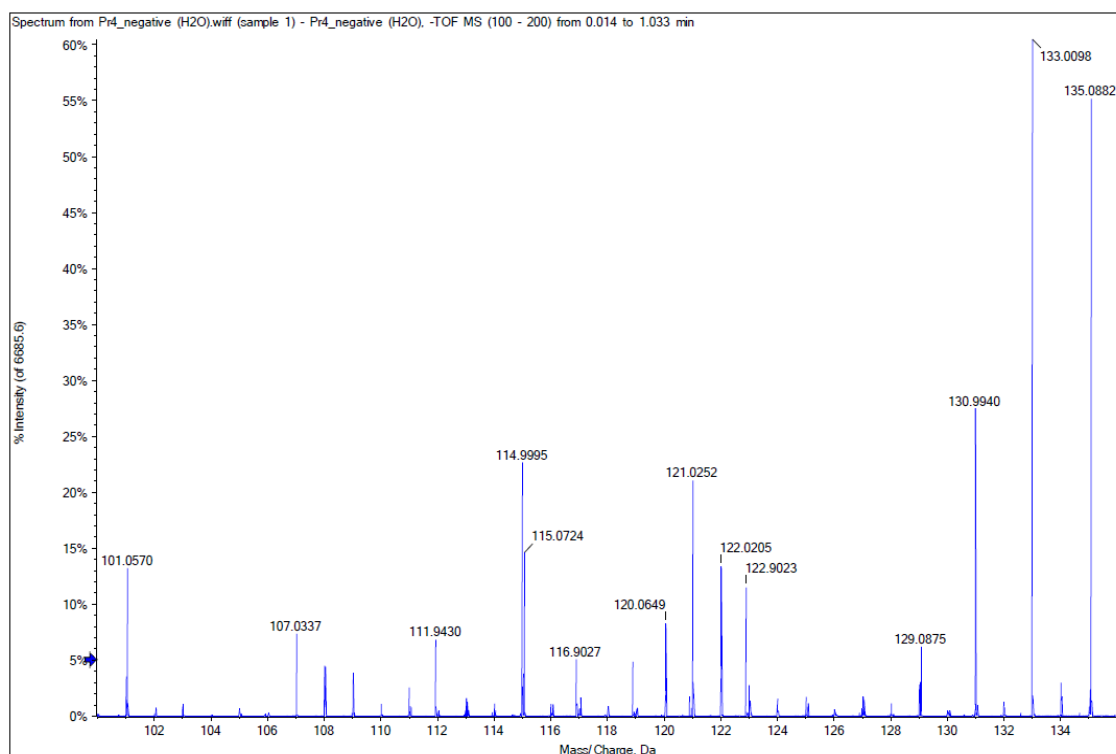
#### NEGATIVE – ION MODE



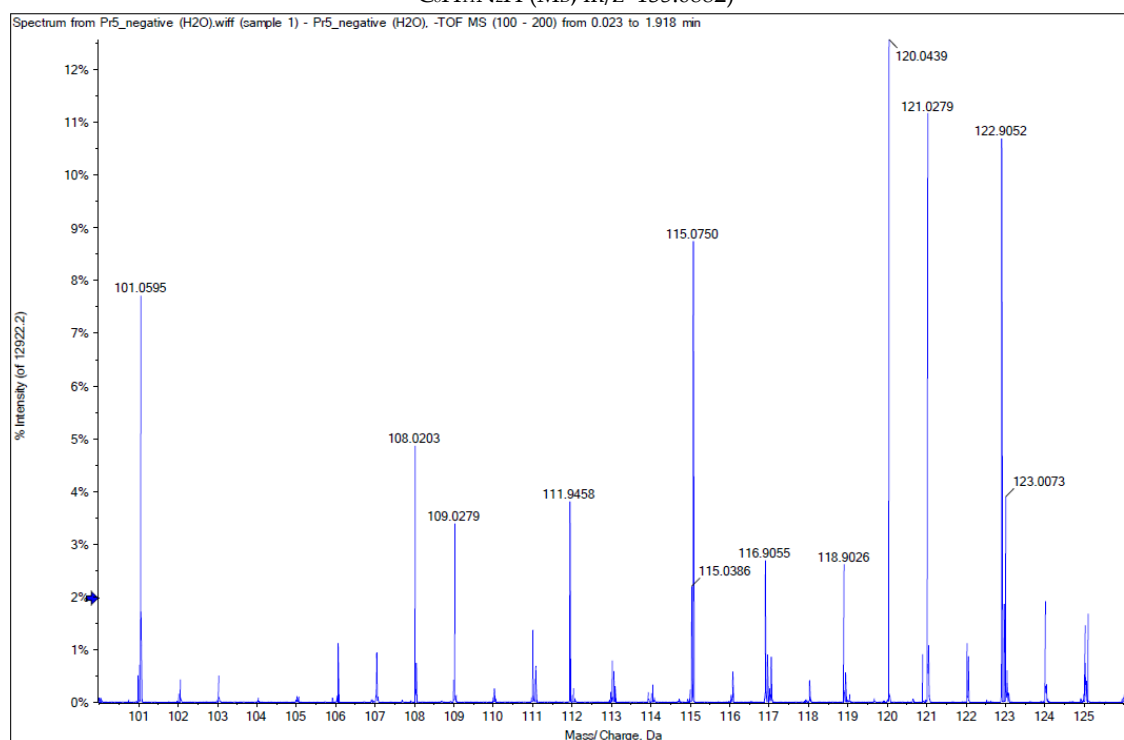
**Figure S1.** ESI-MS(-) of MO standard with molecular formula  $C_{14}H_{14}N_3SO_3$  ( $M_{MO}$ ,  $m/z$  – 304.0760)



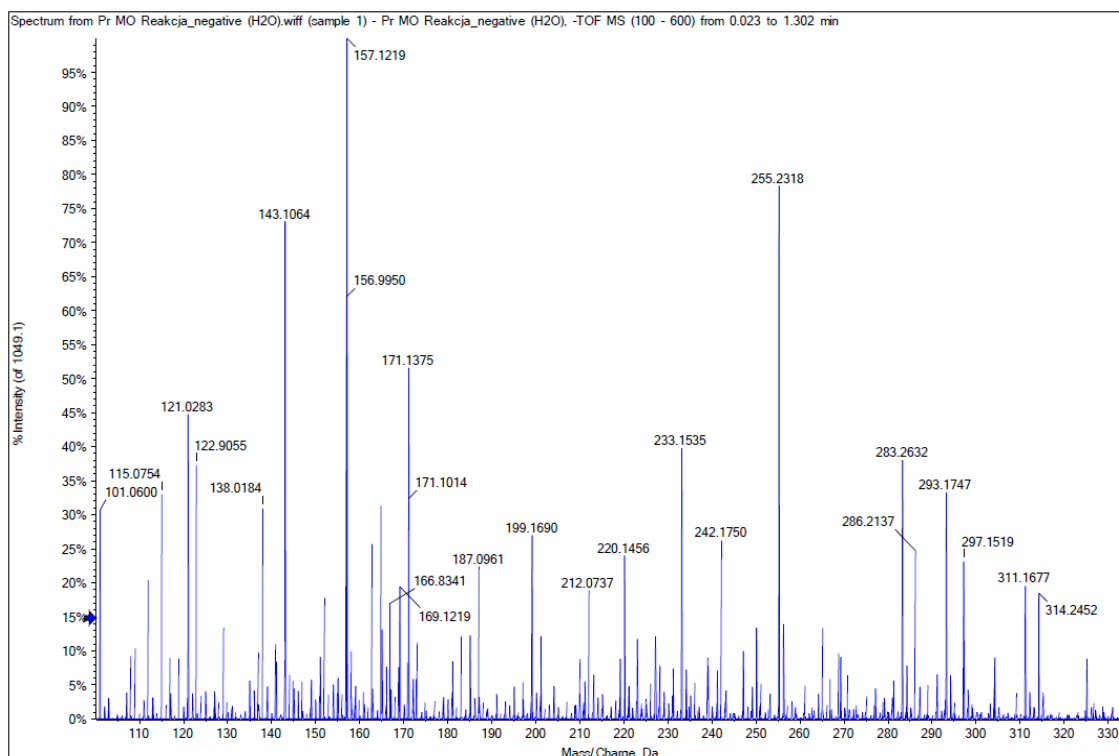
**Figure S2.** ESI-MS(-) of benzenesulphonic acid radical anion standard with molecular formula  $C_6H_5O_3S$  ( $M_{BA}$ ,  $m/z$  – 156.9978)



**Figure S3.** ESI-MS(-) of N,N-dimethyl-p-phenylenediamine radical anion standard with molecular formula  $C_8H_{11}N_2H$  ( $M_D$ ,  $m/z=135.0882$ )



**Figure S4.** ESI-MS(-) of N,N-dimethylbenzenamine radical anion standard with molecular formula  $C_8H_{10}N$  ( $M_{DB}$ ,  $m/z = 120.0439$ )

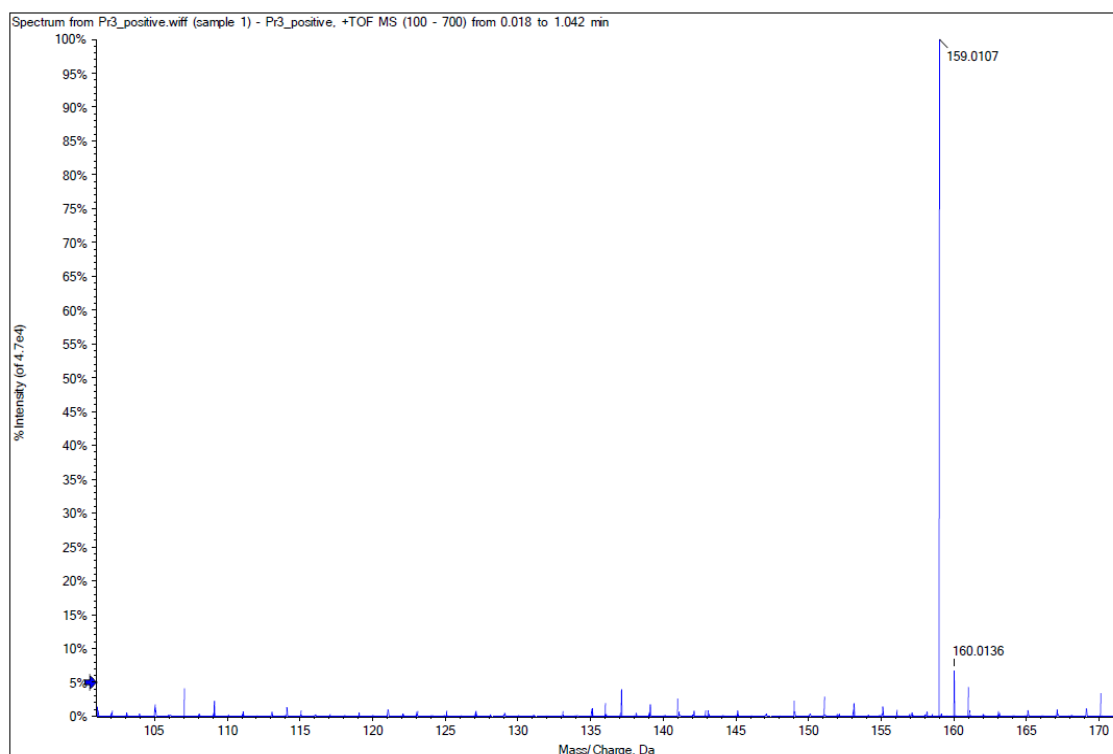


**Figure S5.** ESI-MS(-) of MO reaction mixture, Mass/Charge – 100-600 [Da]

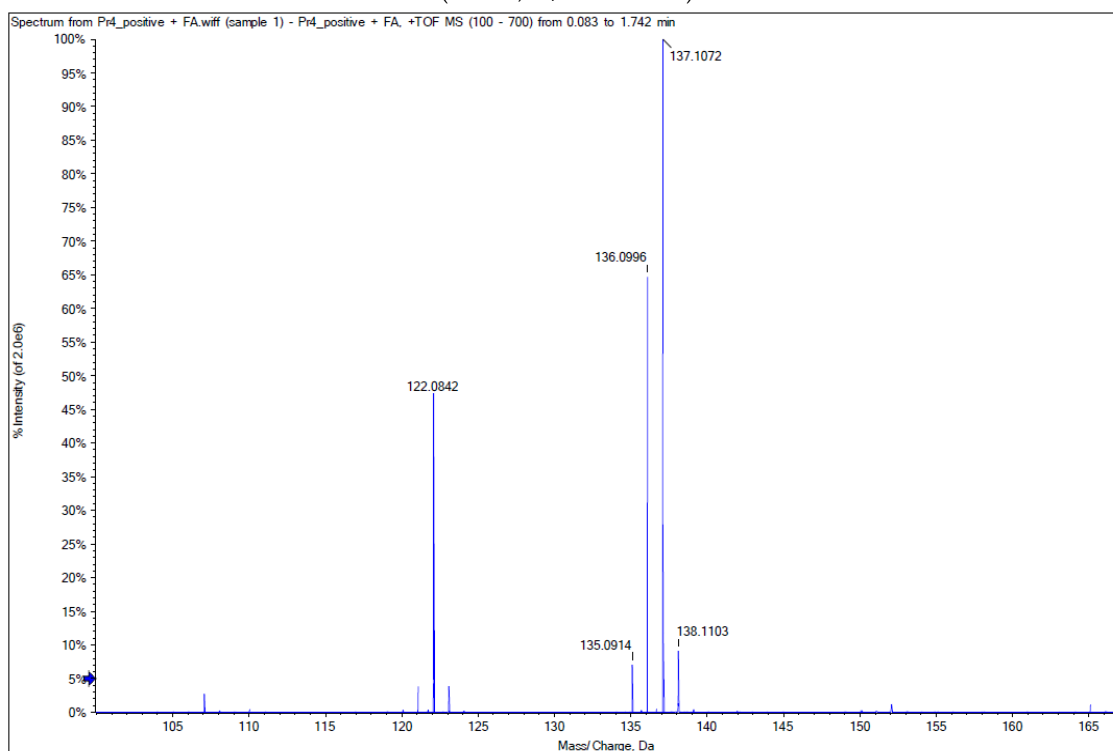
## POSITIVE- ION MODE



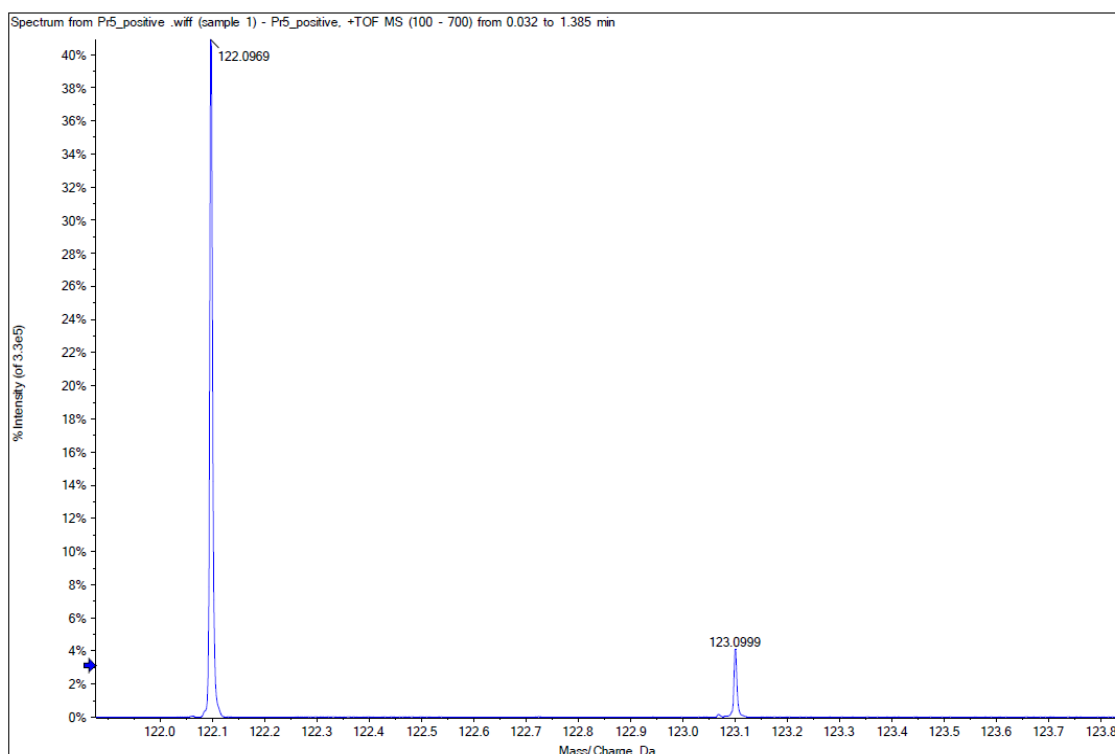
**Figure S6.** ESI-MS(+) of MO standard with molecular formula  $C_{14}H_{16}N_3SO_3$  ( $M_{MOH_2}$ ,  $m/z=306.0918$ )



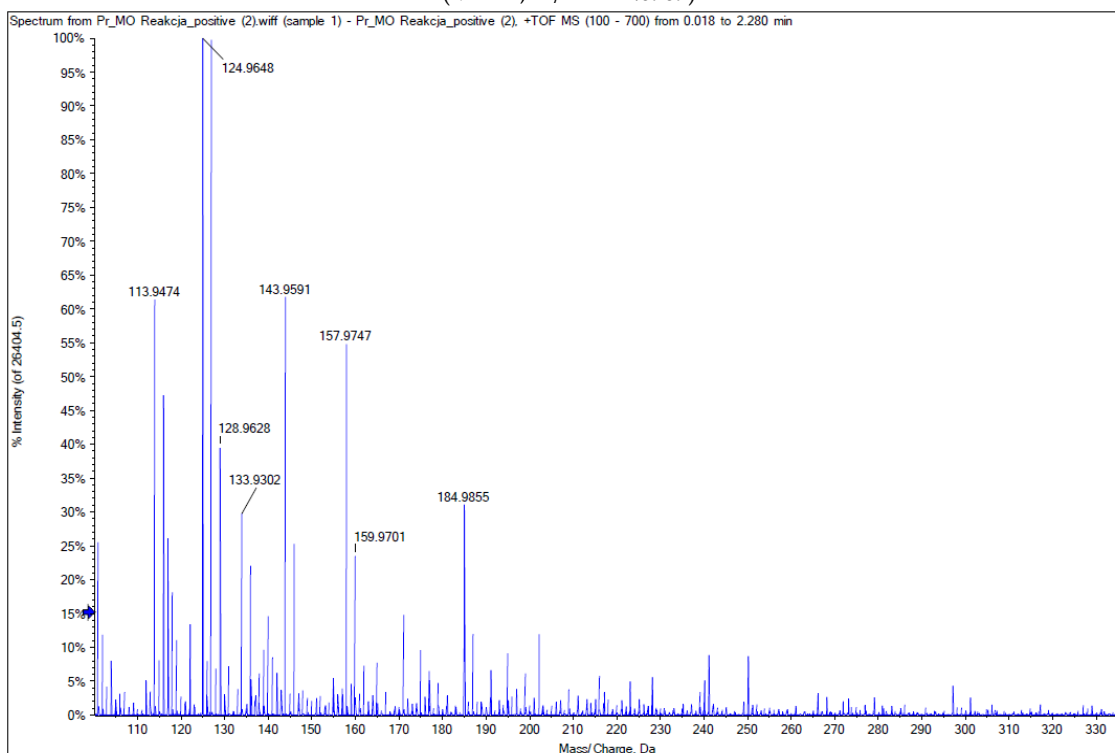
**Figure S7.** ESI-MS(+) of benzenesulphonic acid radical cation standard with molecular formula  $C_6H_5O_3SH_2$  ( $M_{BAH_2}$ ,  $m/z$  – 159.0107)



**Figure S8.** ESI-MS(+) of N,N-dimethyl-p-phenylenediamine radical cation standard with molecular formula,  $C_8H_{11}N_2H_2$  ( $M_{DH}$ ,  $m/z$  – 137.1072)

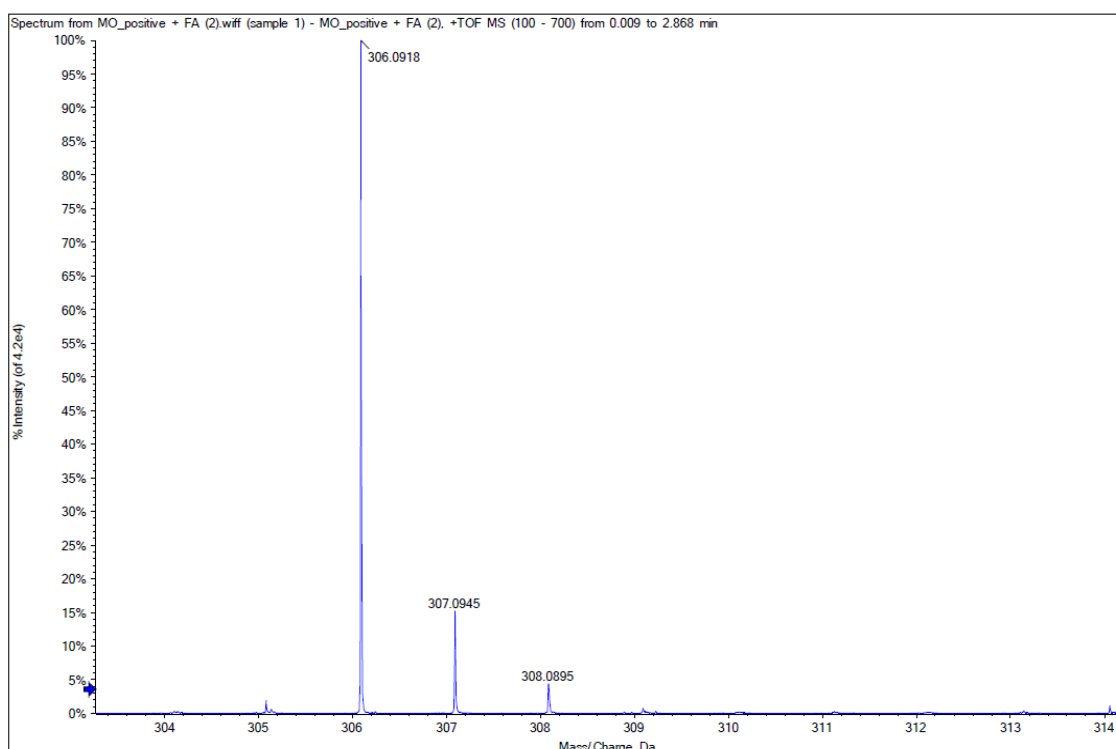


**Figure S9.** ESI-MS(+) of N,N-dimethylbenzenamine radical cation standard with molecular formula  $C_8H_{10}NH_2$  ( $M_{DBH_2}$ ,  $m/z = 122.0969$ )

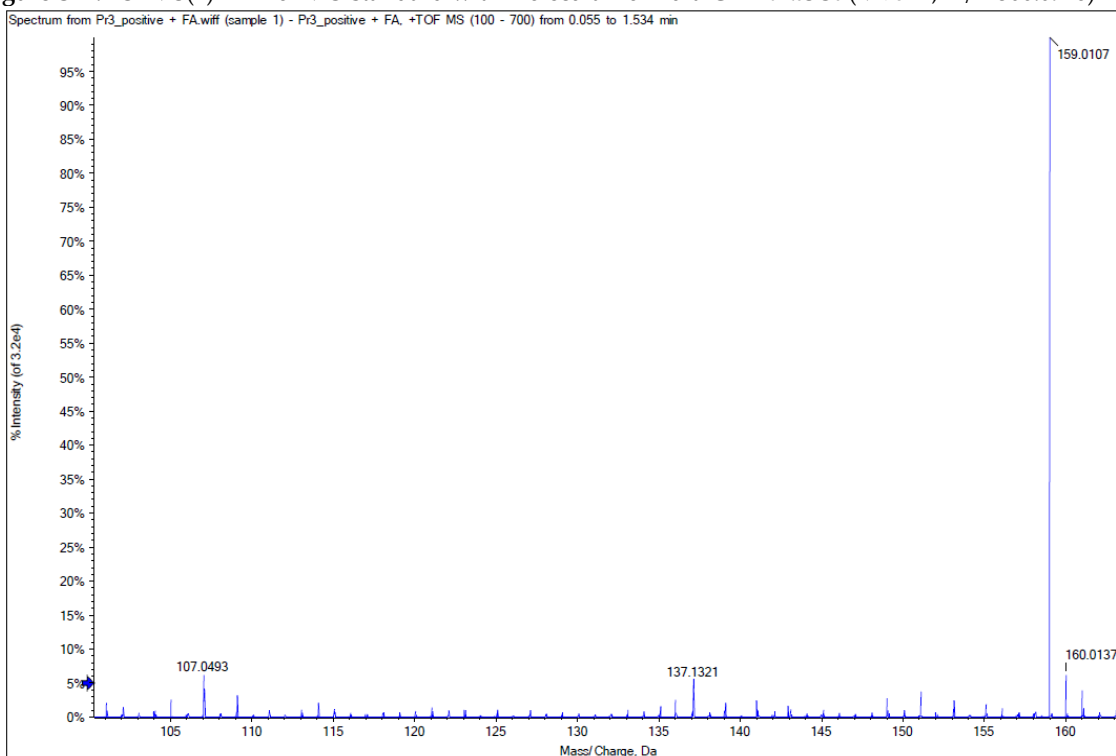


**Figure S10.** ESI-MS(+) of MO reaction mixture, Mass/Charge – 100-700 [Da]

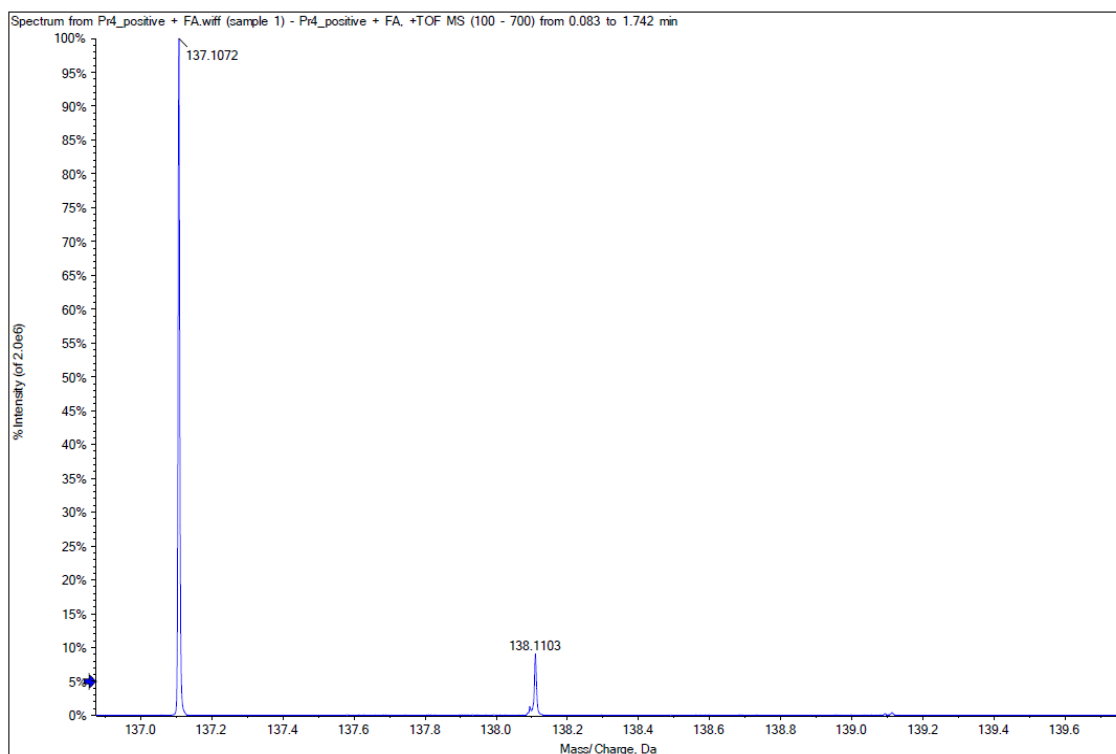
**POSITIVE – ION MODE + FA (Formic acid)**



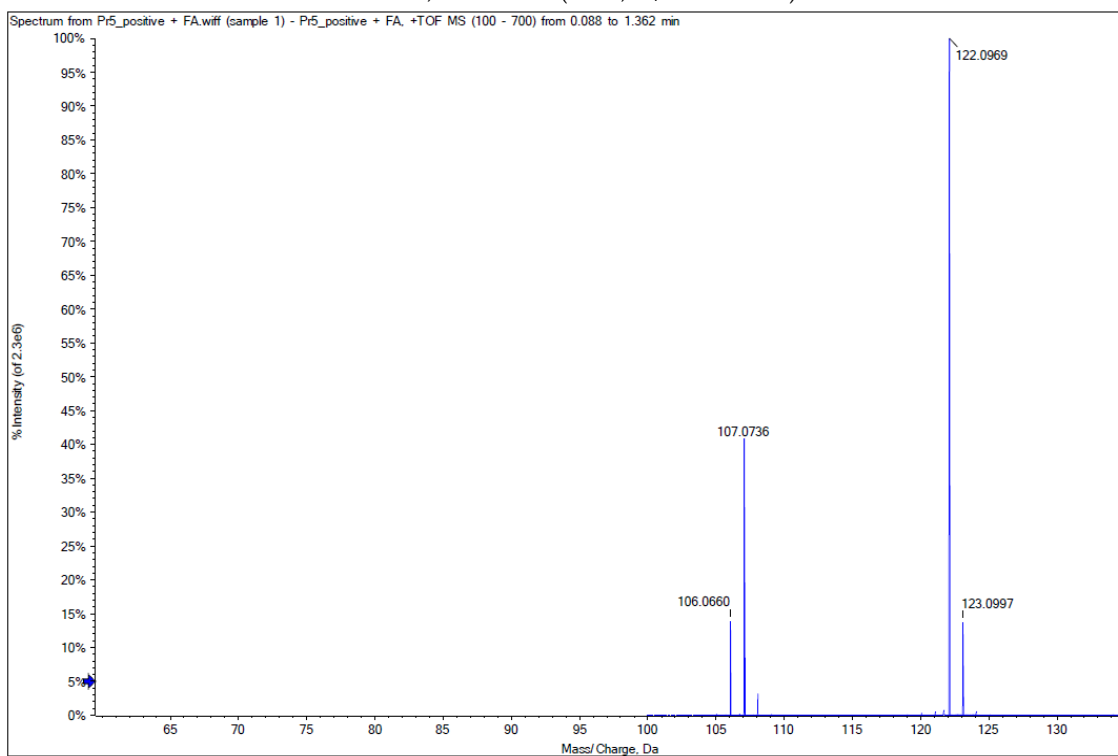
**Figure S11.** ESI-MS(+) + FA of MO standard with molecular formula  $C_{14}H_{16}N_3SO_3$  ( $M_{MOH_2}$ ,  $m/z=306.0918$ )



**Figure S12.** ESI-MS(+) + FA of benzenesulphonic acid radical cation standard with molecular formula  $C_6H_5O_3SH_2$  ( $M_{BAH_2}$ ,  $m/z - 159.0107$ )

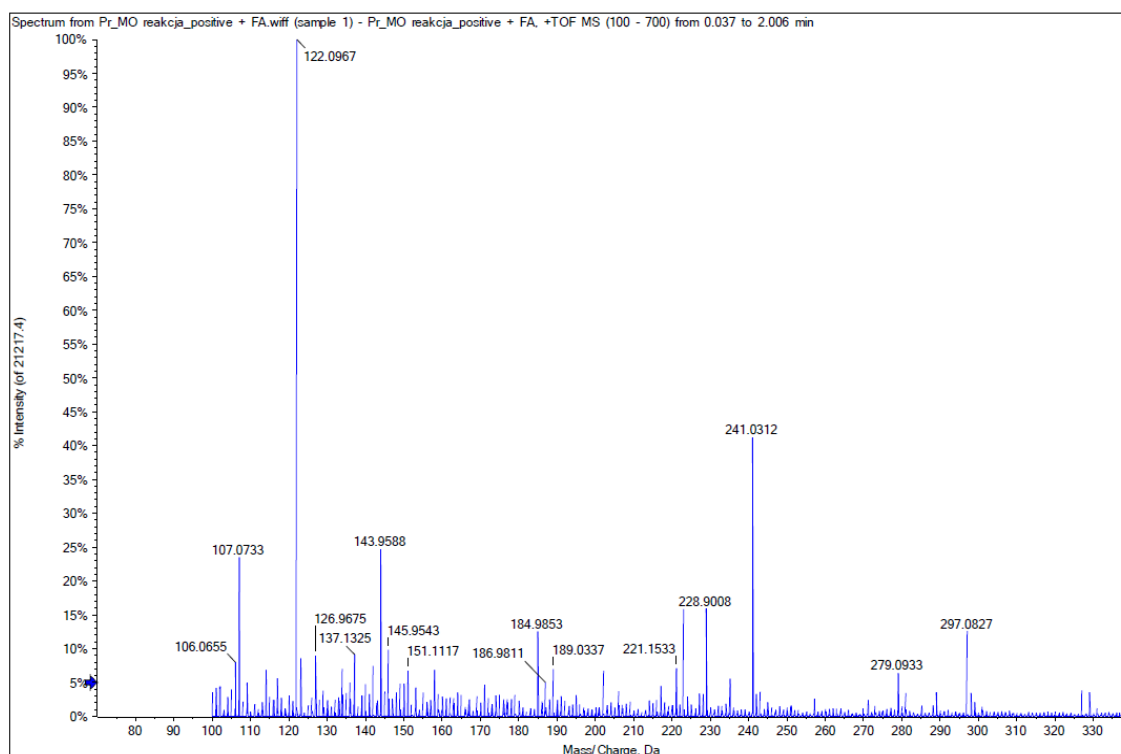


**Figure S13.** ESI-MS(+) + FA of N,N-dimethyl-p-phenylenediamine radical cation standard with molecular formula,  $C_8H_{11}N_2H_2$  ( $M_{DH}$ ,  $m/z$  – 137.1072)



**Figure S14.** ESI-MS(+) + FA of N,N-dimethylbenzenamine radical cation standard with molecular formula  $C_8H_{10}NH_2$  ( $M_{DBH_2}$ ,  $m/z$  = 122.0969)





**Figure S15.** ESI-MS(+) + FA of MO reaction mixture, Mass/Charge – 100-700 [Da]