

Catalytic N-oxidation of tertiary amines on RuO₂NPs anchored graphene nanoplatelets

Mayakrishnan Gopiraman,^a Hyunsik Bang,^a Sundaram Ganesh Babu,^{a,d} Kai Wei,^{*}

^{a,c} Ramasamy Karvembu^{*,b} and Ick Soo Kim ^{*,a}

^aNano Fusion Technology Research Lab, Interdisciplinary Graduate School of Science and Technology, Shinshu University, Ueda, Nagano–386 8567, Japan

^bDepartment of Chemistry, National Institute of Technology, Tiruchirappalli–620 015, India

^cCollege of Textile Clothing Engineering, Soochow University, Suzhou, 215021, China

^dSRM Research Institute, SRM University, Kattankulathur 603203, India

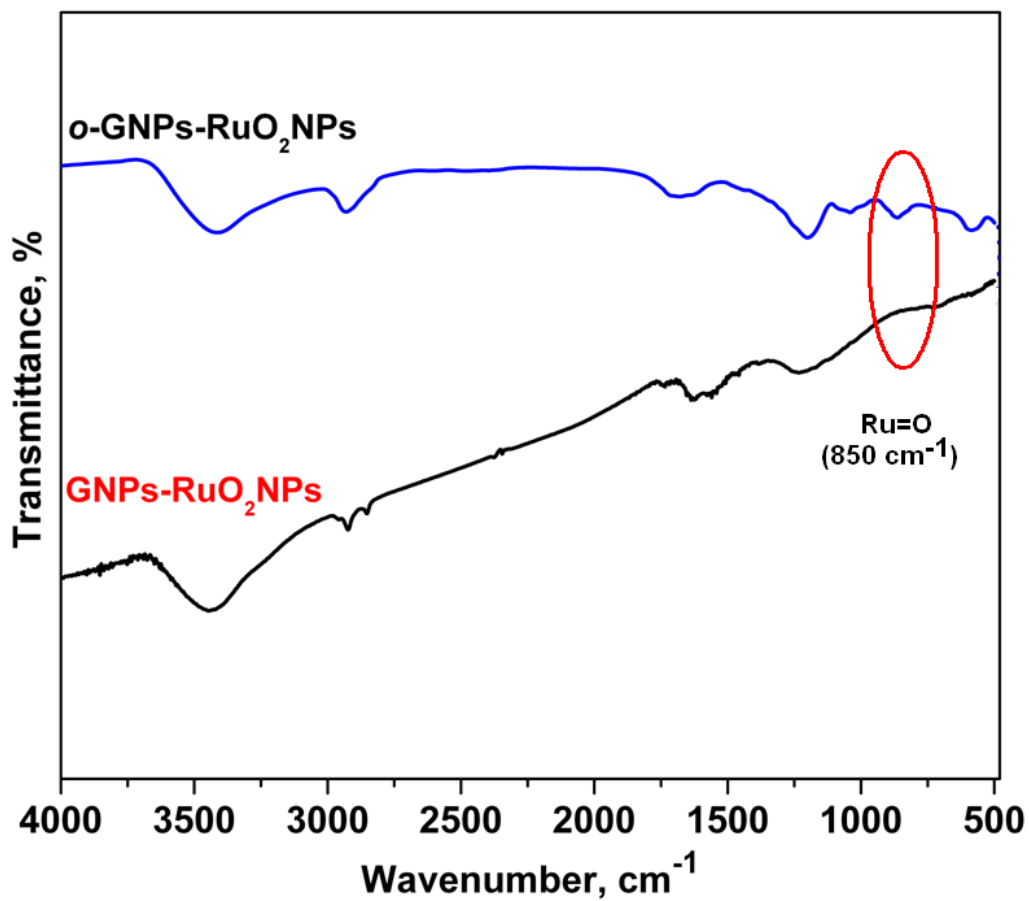


Fig. S1. FT-IR spectra of GNP-RuO₂NPs and *o*-GNPs-RuO₂NPs.

^1H -NMR, ^{13}C -NMR and FT-IR spectra of products (N-oxides, Table 1)

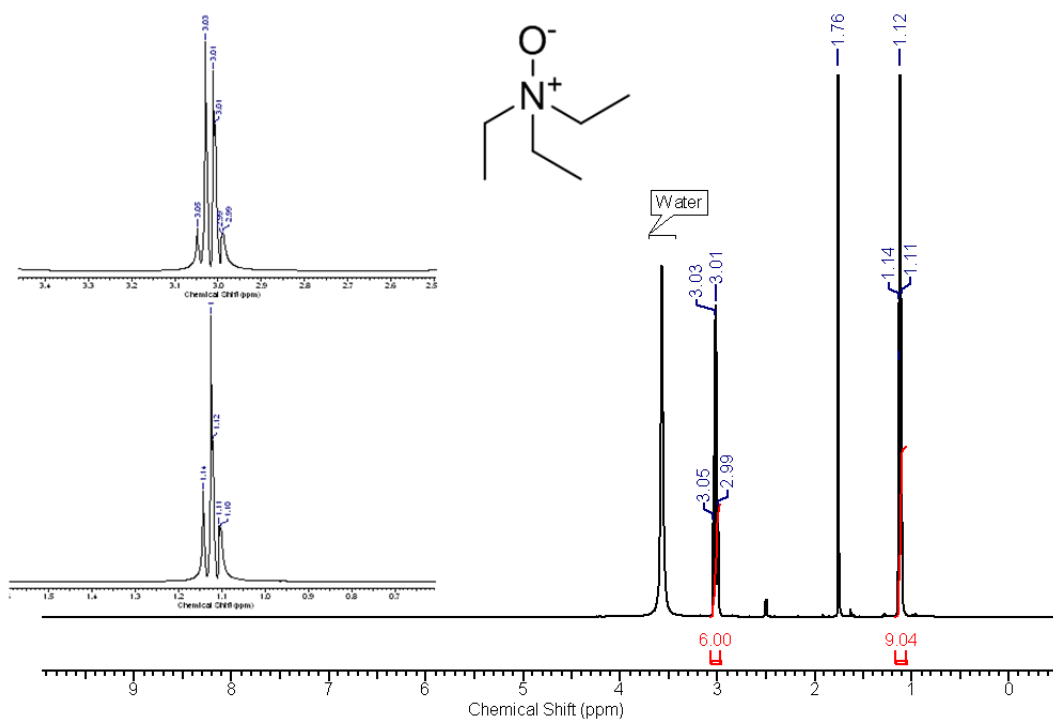


Fig. S2 ^1H -NMR spectrum of triethylamine N-oxide (Table 1, entry 1).

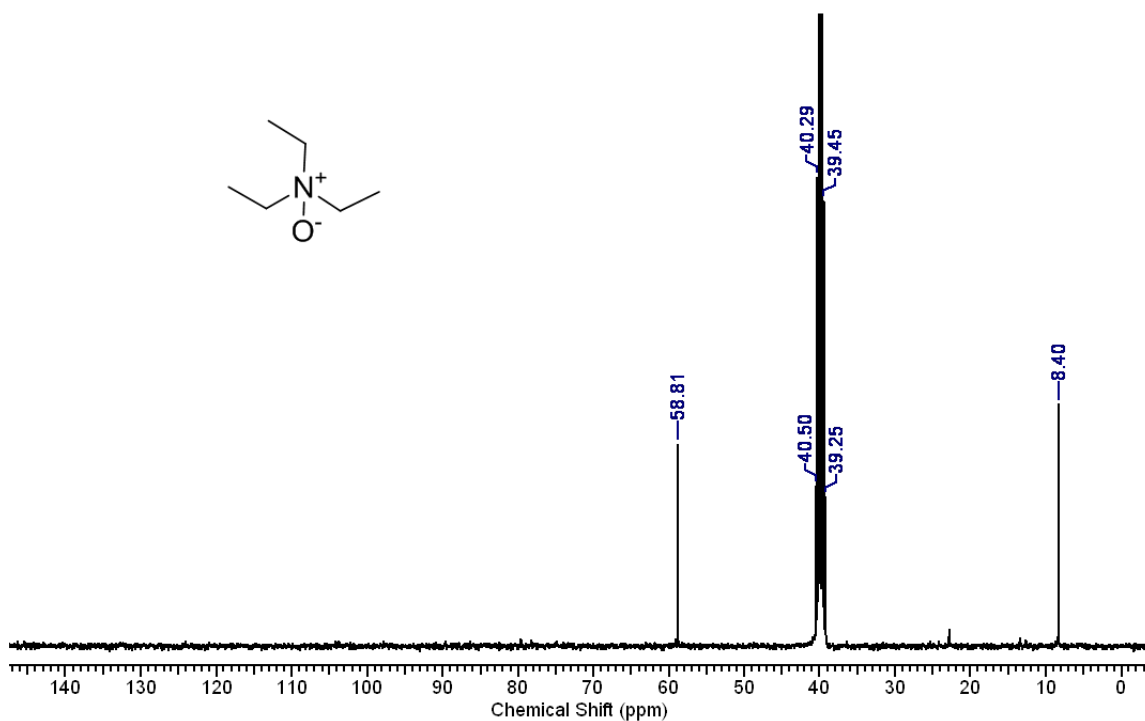


Fig. S3 ^{13}C -NMR spectrum of triethylamine N-oxide (Table 1, entry 1).

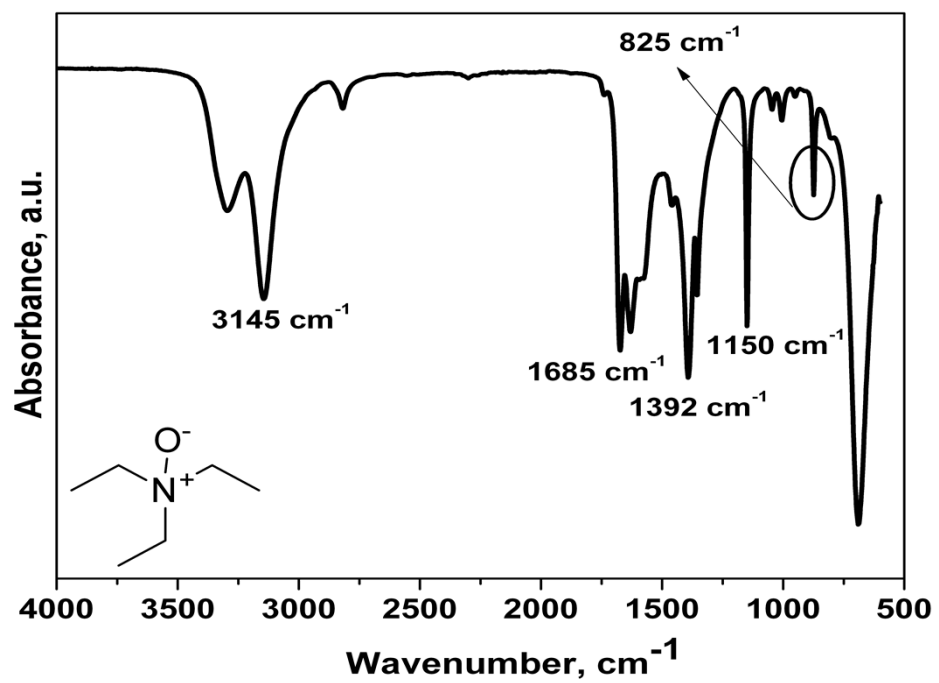


Fig. S4 FT-IR spectrum of triethylamine N-oxide (Table 1, entry 1).

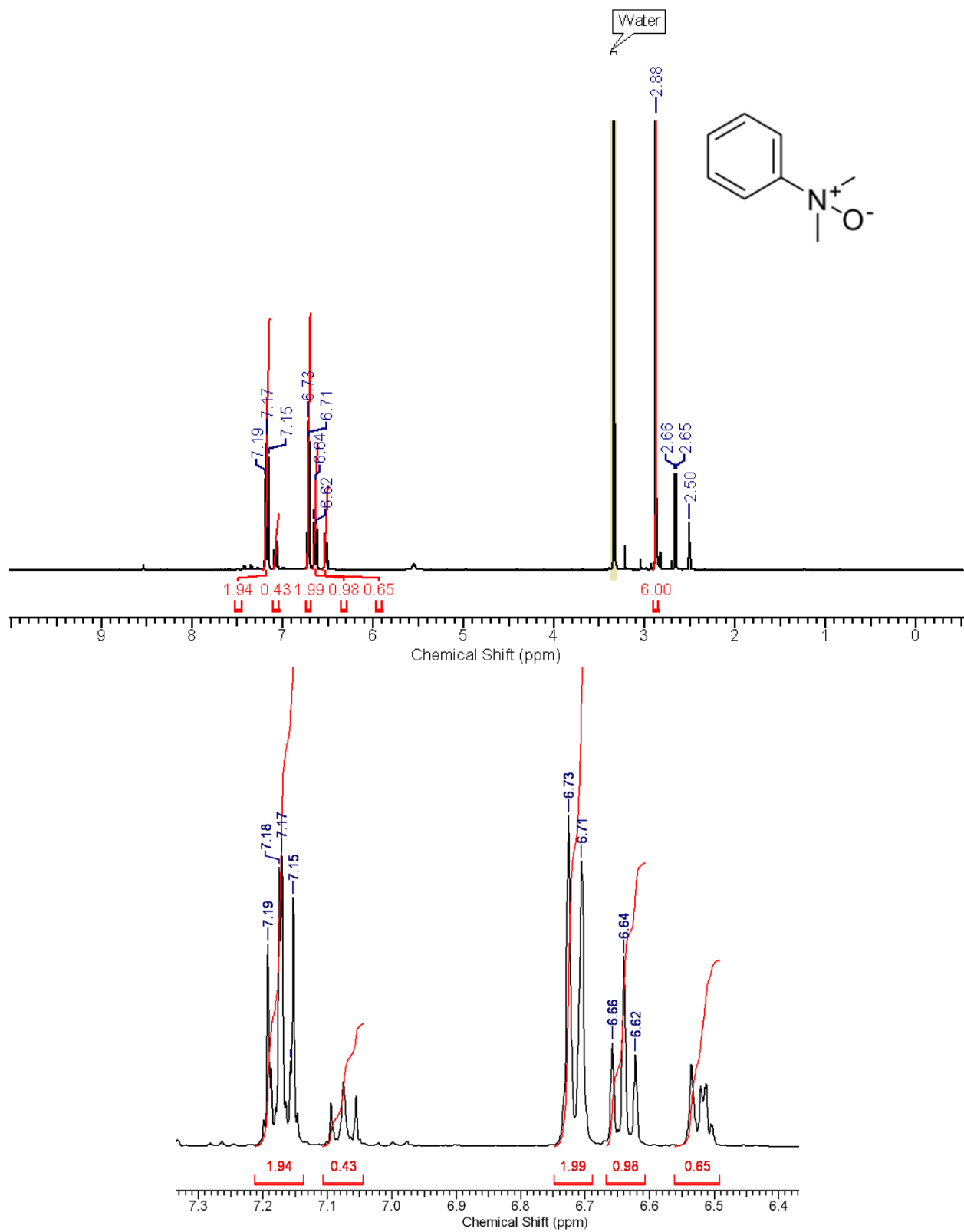


Fig. S5 $^1\text{H-NMR}$ spectrum of N,N-Dimethyl aniline N-oxide (Table 1, entry 2).

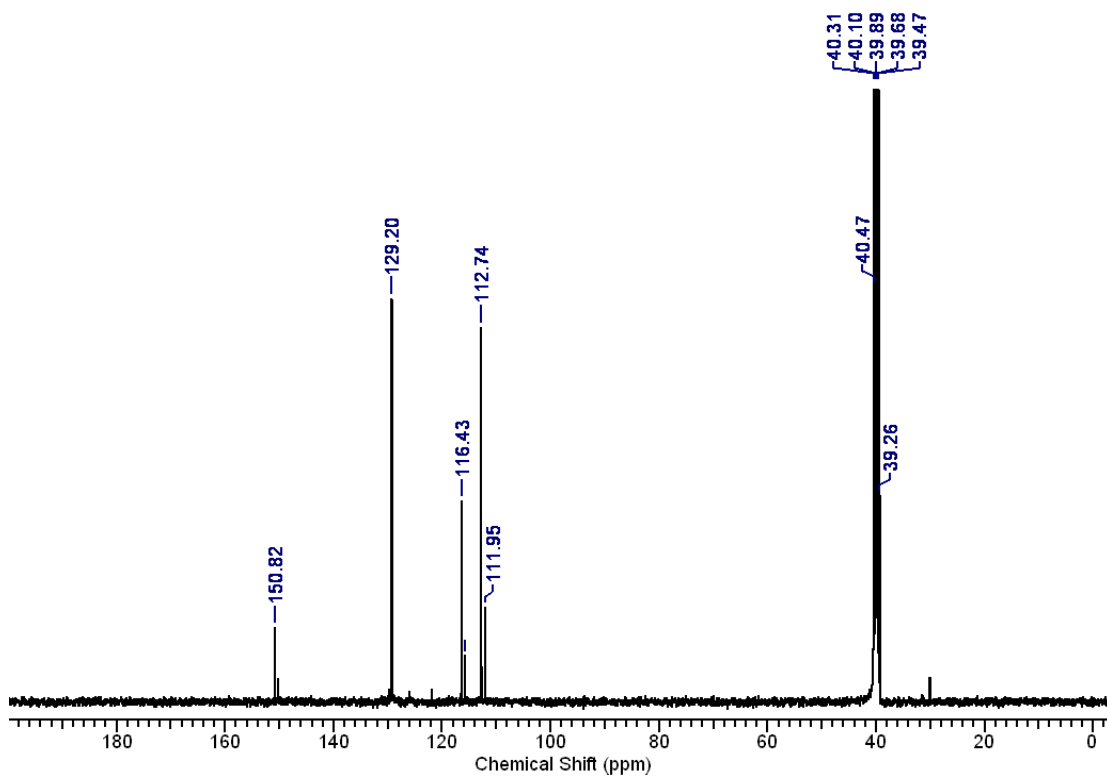


Fig. S6 ^{13}C -NMR spectrum of N,N-Dimethyl aniline N-oxide (Table 1, entry 2).

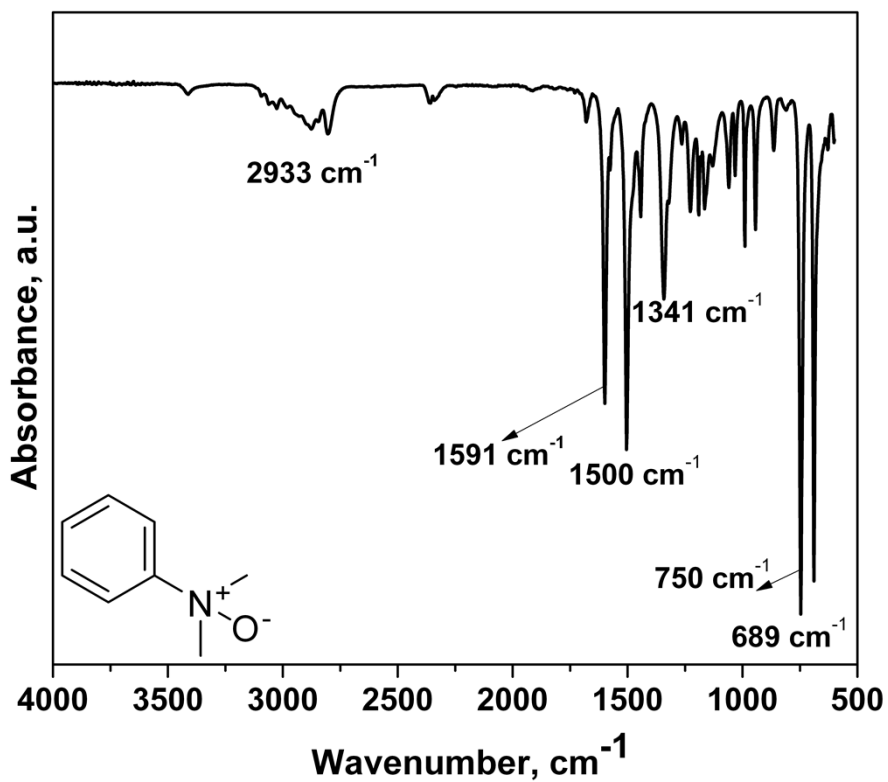


Fig. S7 FT-IR spectrum of N,N-Dimethyl aniline N-oxide (Table 1, entry 2).

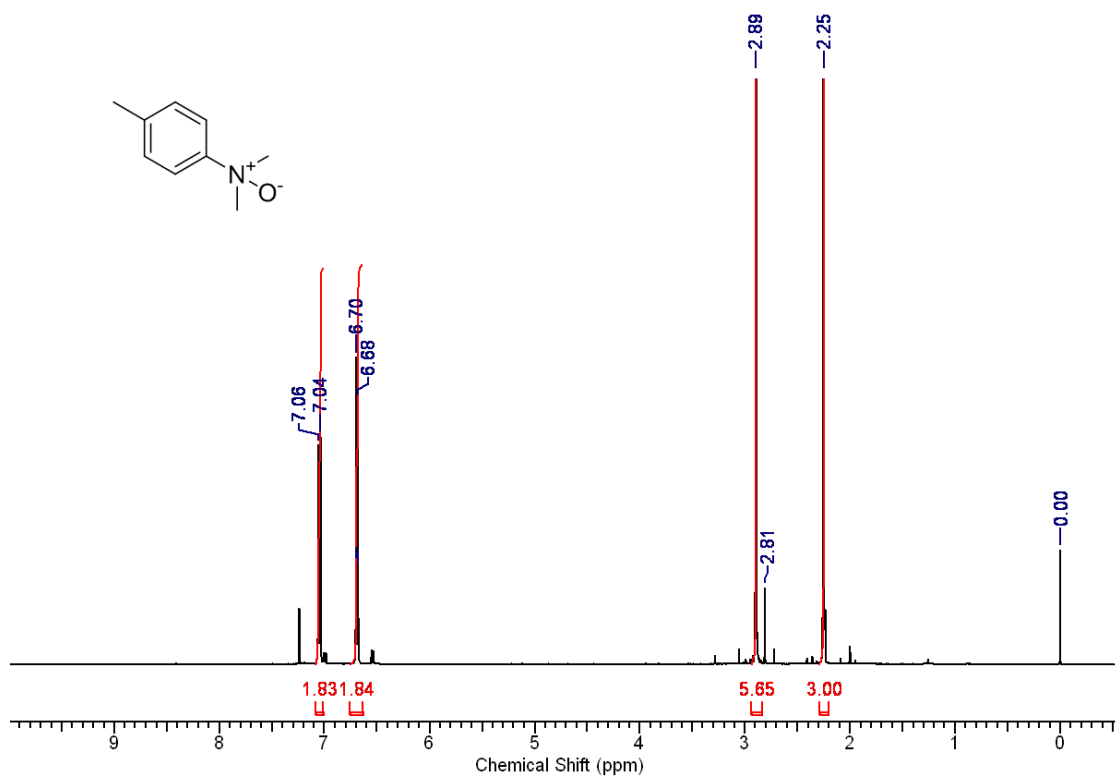


Fig. S8 ^1H -NMR spectrum of N,N-Dimethyl-p-toluidine N-oxide (Table 1, entry 3).

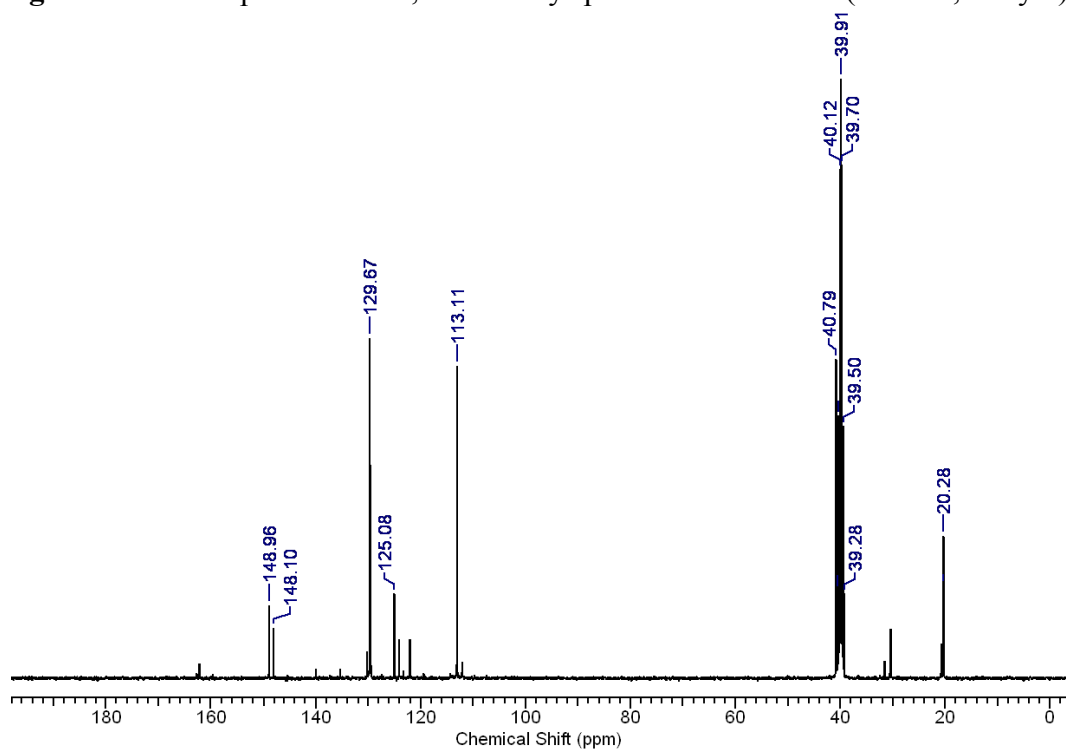


Fig. S9 ^{13}C -NMR spectrum of N,N-Dimethyl-p-toluidine N-oxide (Table 1, entry 3).

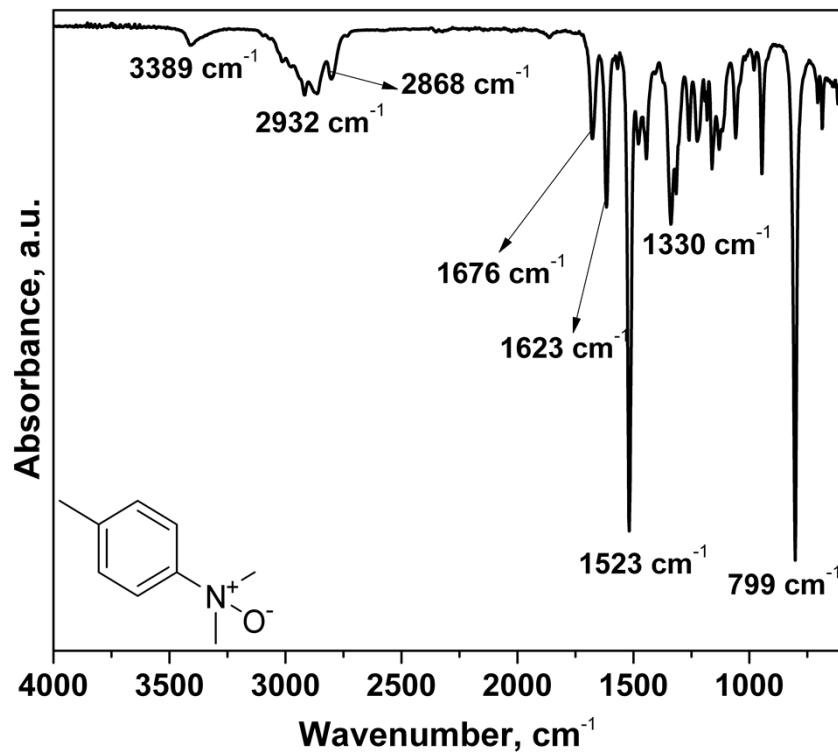


Fig. S10 FT-IR spectrum of N,N-Dimethyl-p-toluidine N-oxide (Table 1, entry 3).

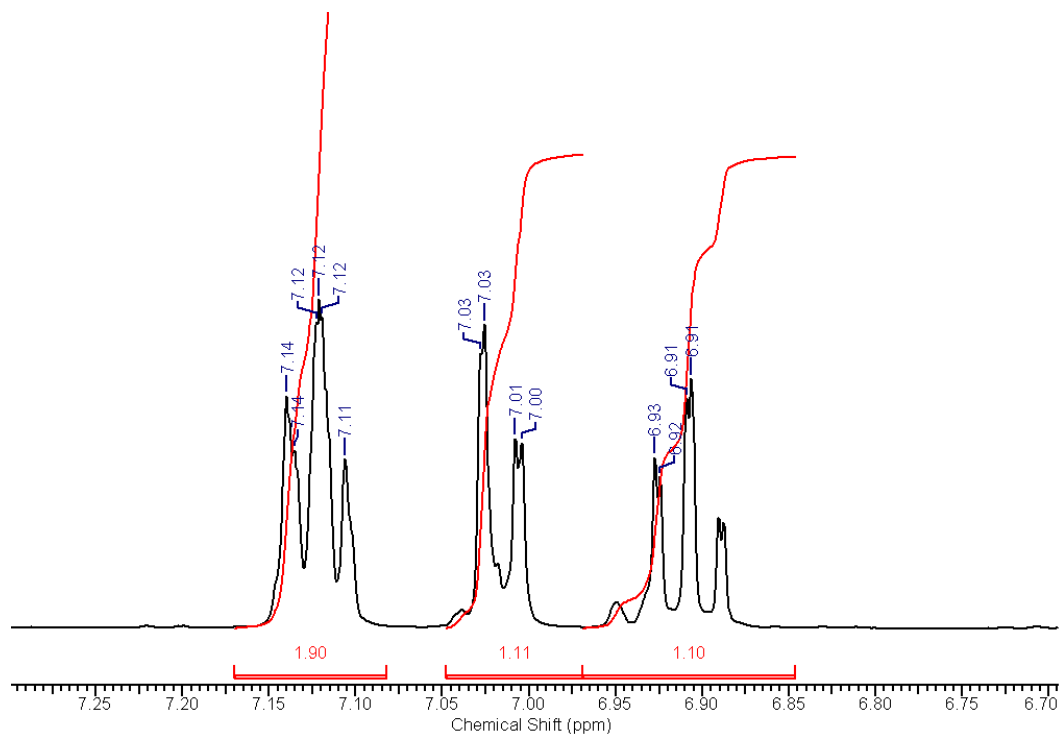
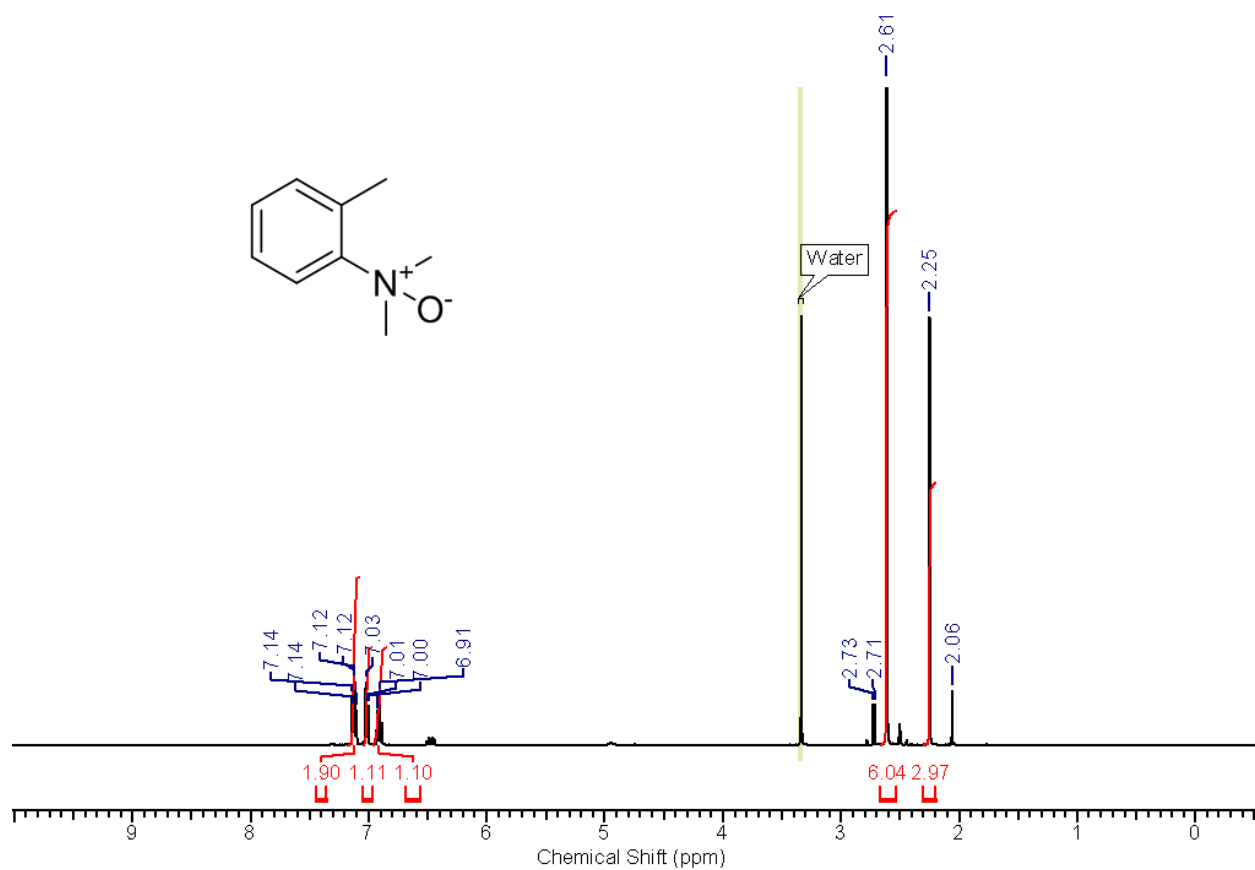


Fig. S11 $^1\text{H-NMR}$ spectrum of N,N-Dimethyl-o-toluidine N-oxide (Table 1, entry 4).

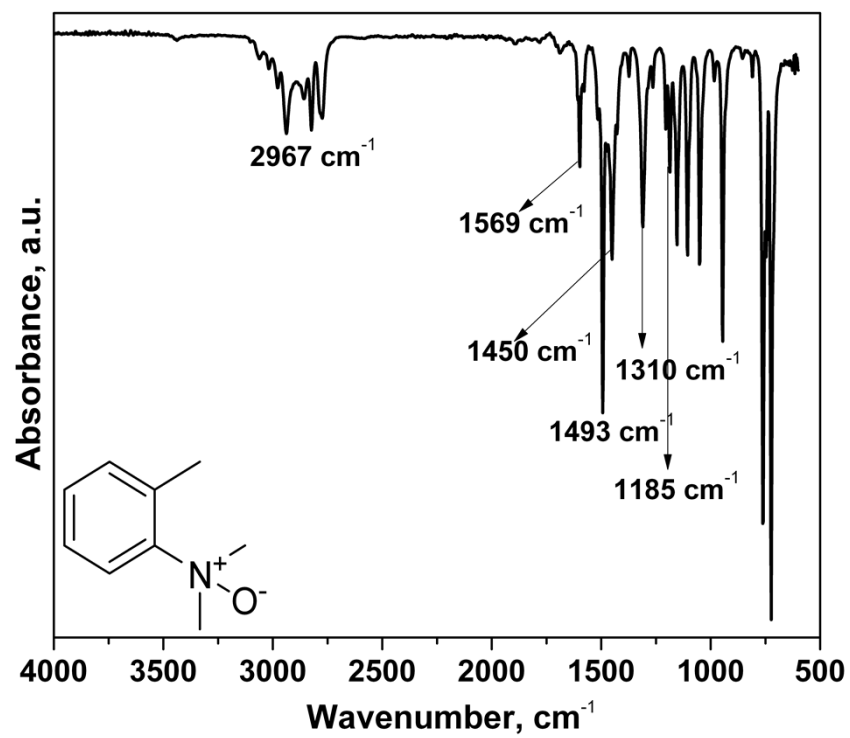


Fig. S12 FT-IR spectrum of N,N-Dimethyl-o-toluidine N-oxide (Table 1, entry 4).

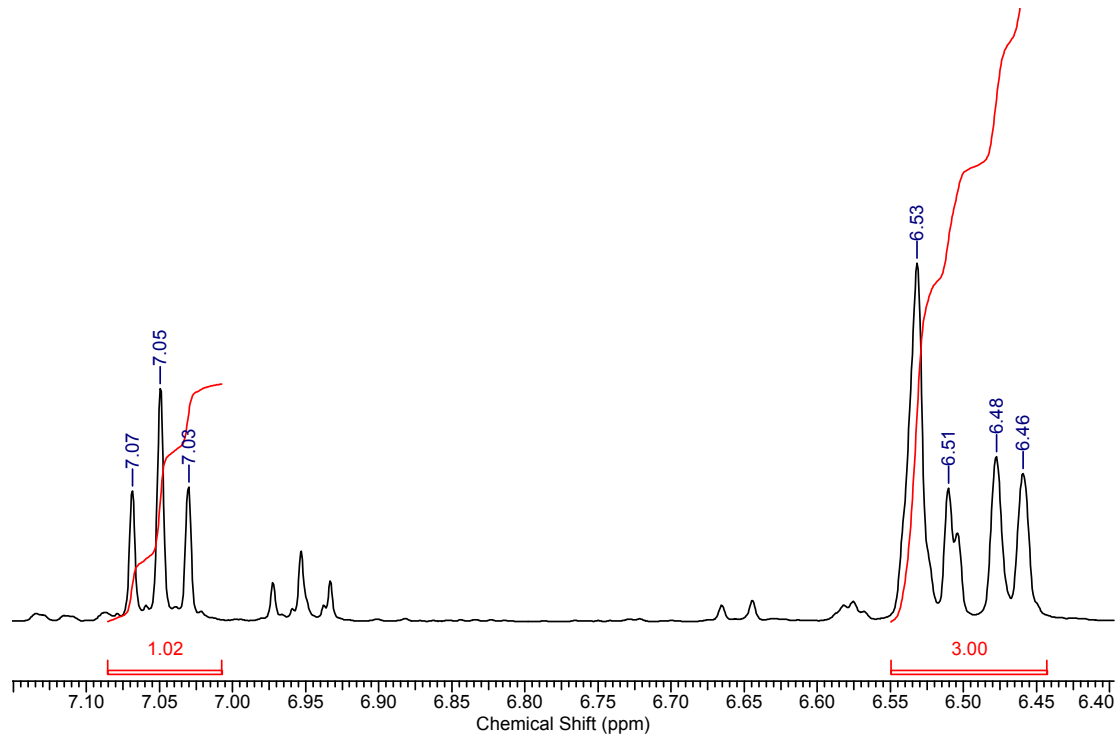
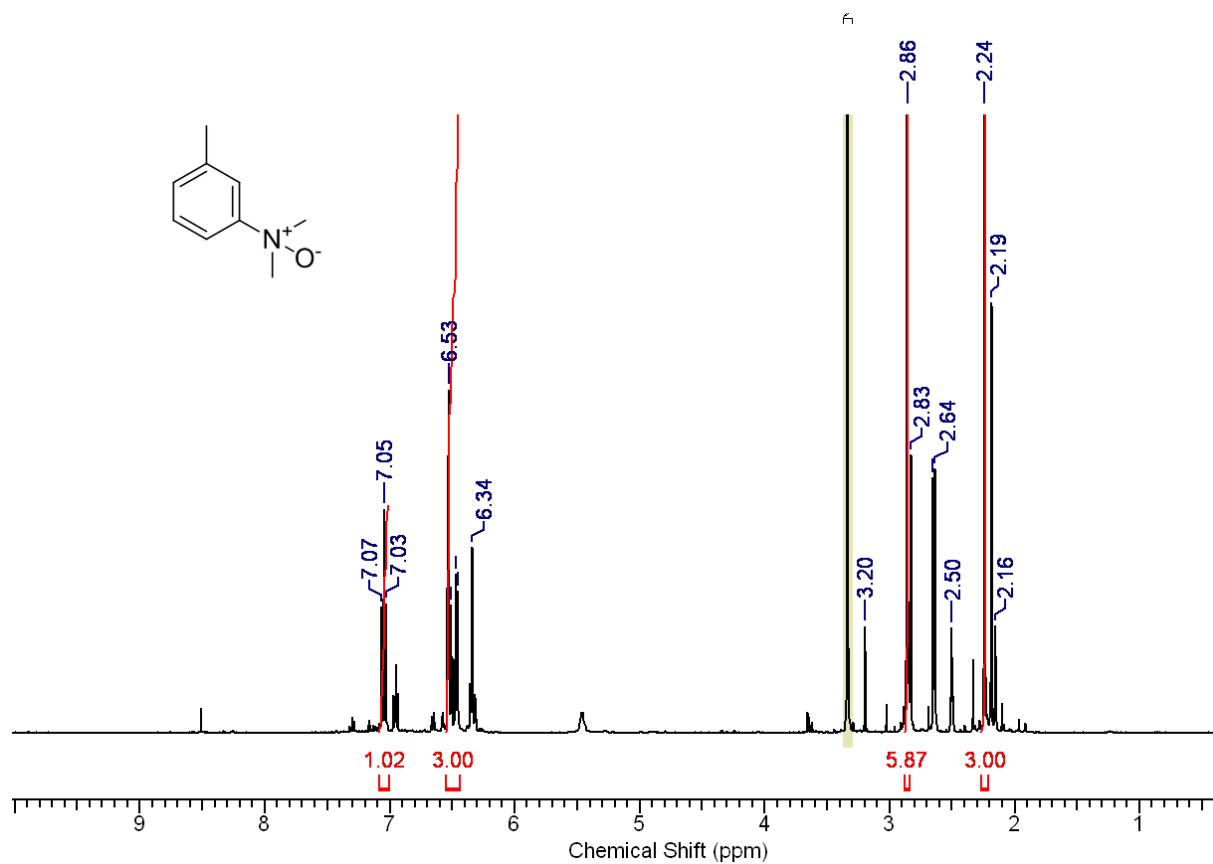


Fig. S13 ^1H -NMR spectrum of N,N-Dimethyl-m-toluidine N-oxide (Table 1, entry 5).

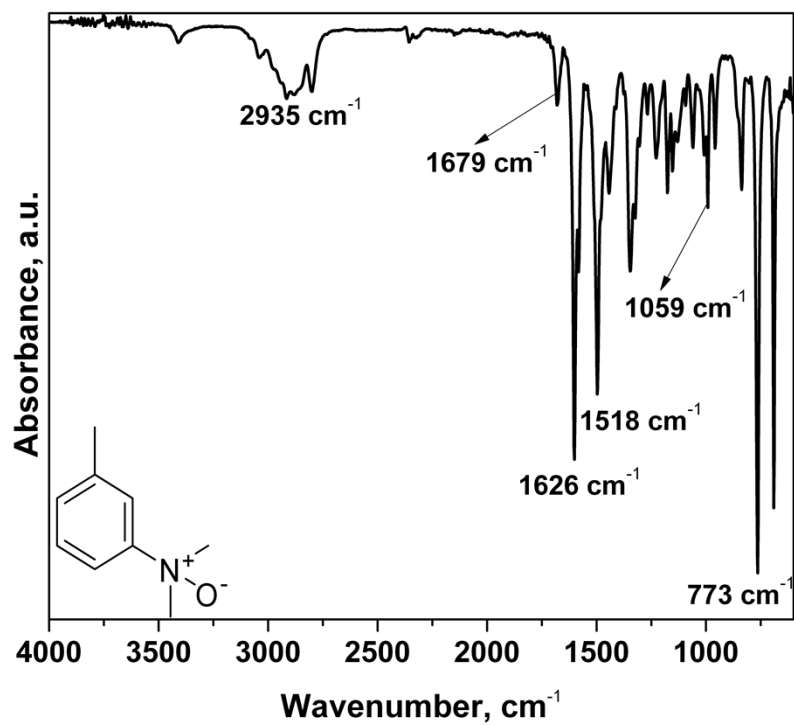


Fig. S14 FT-IR spectrum of N,N-Dimethyl-m-toluidine N-oxide (Table 1, entry 5).

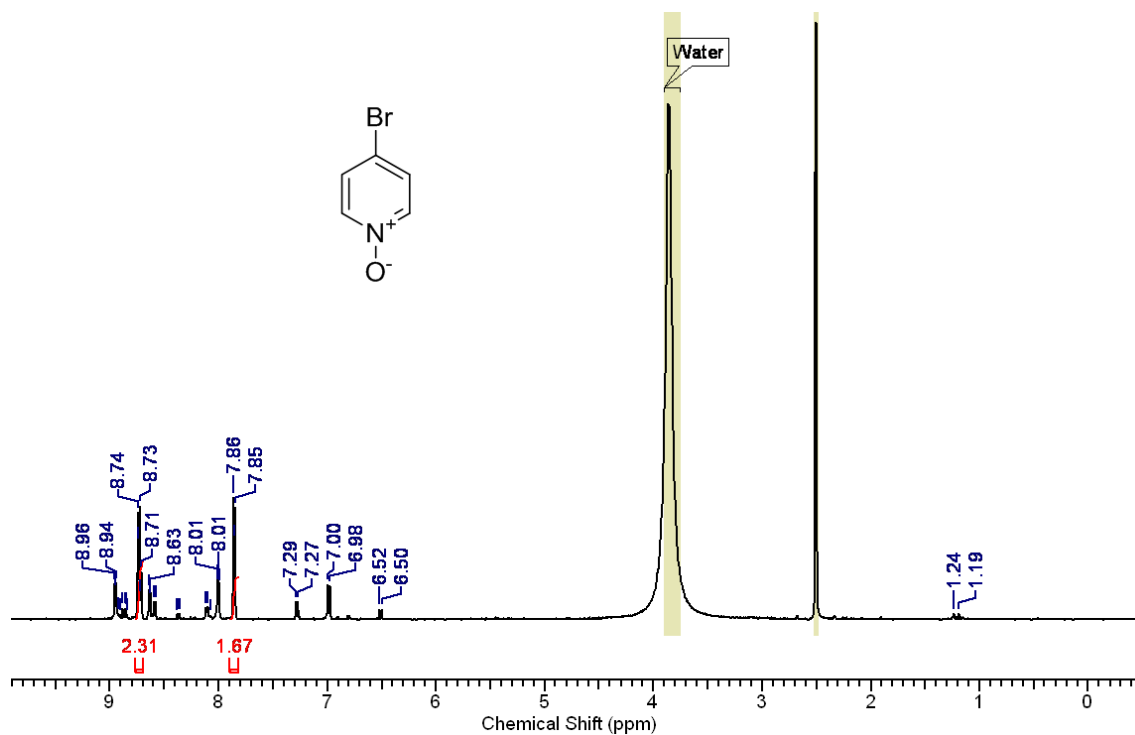


Fig. S15 ¹H-NMR spectrum of 4-bromopyridine N-oxide (Table 1, entry 8).

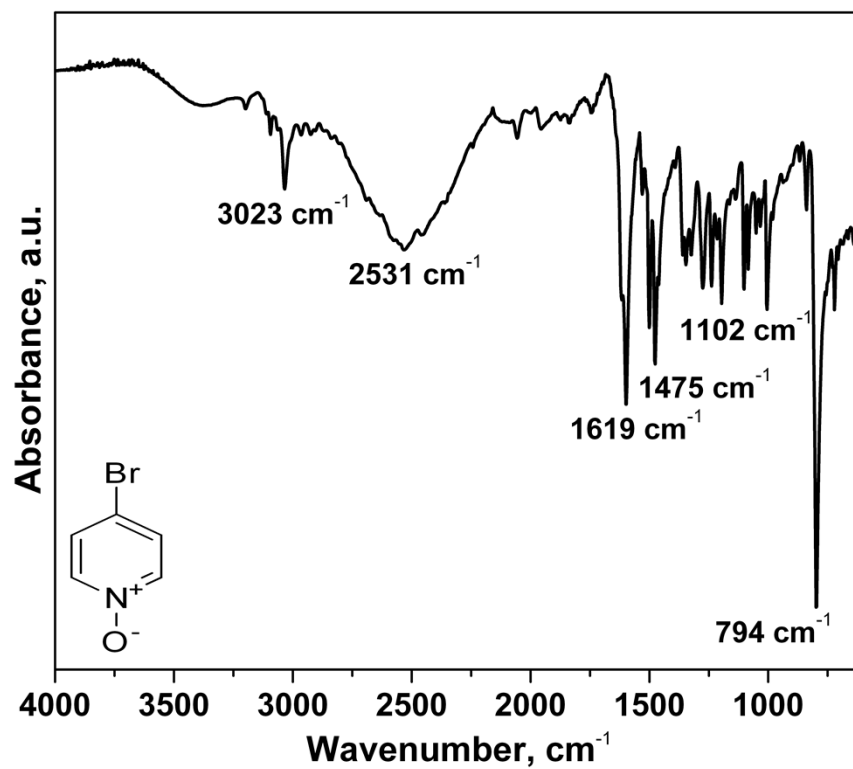


Fig. S16 FT-IR spectrum of 4-bromopyridine N-oxide (Table 1, entry 8).

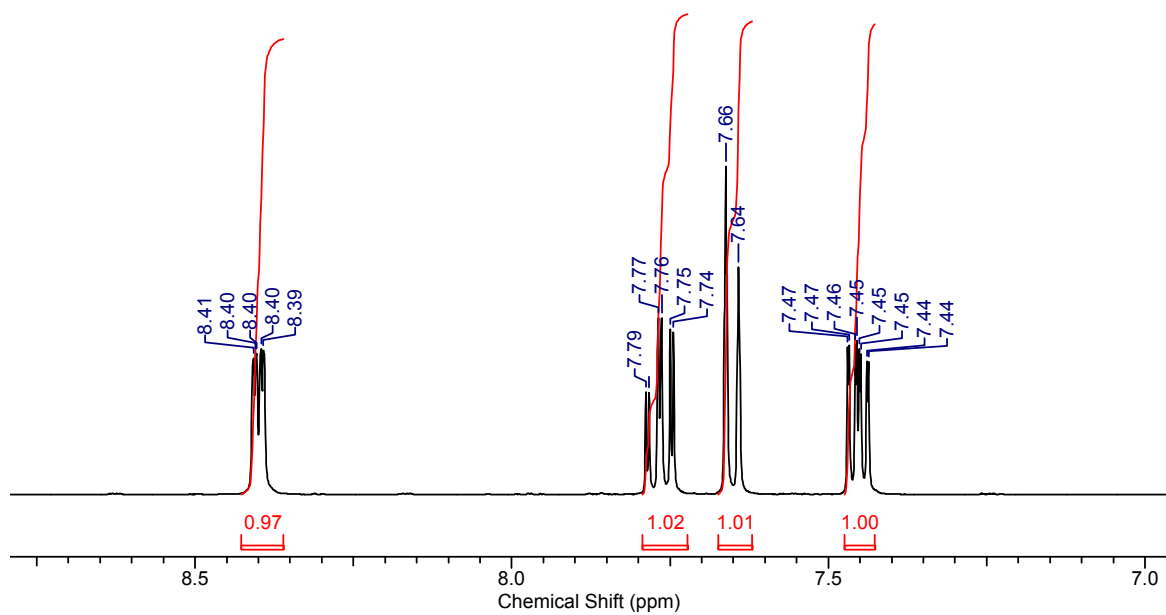
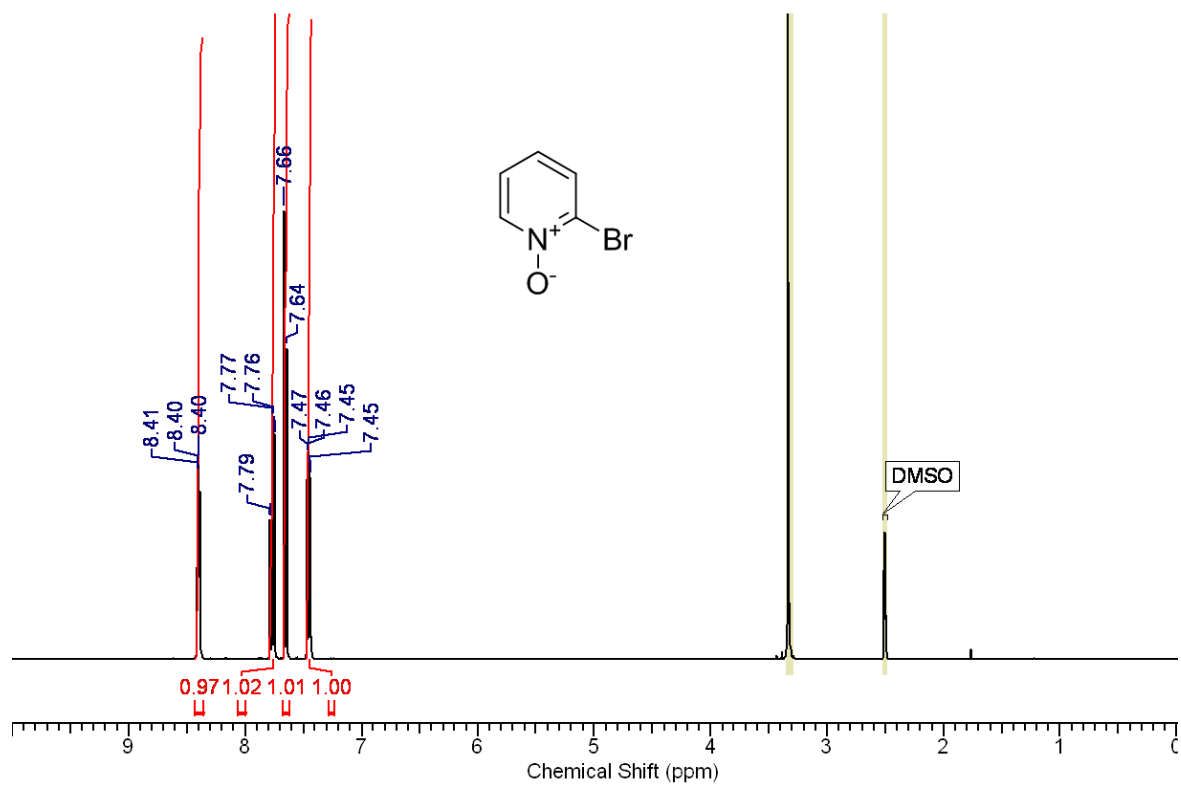


Fig. S17 $^1\text{H-NMR}$ spectrum of 2-bromopyridine oxide (Table 1, entry 9).

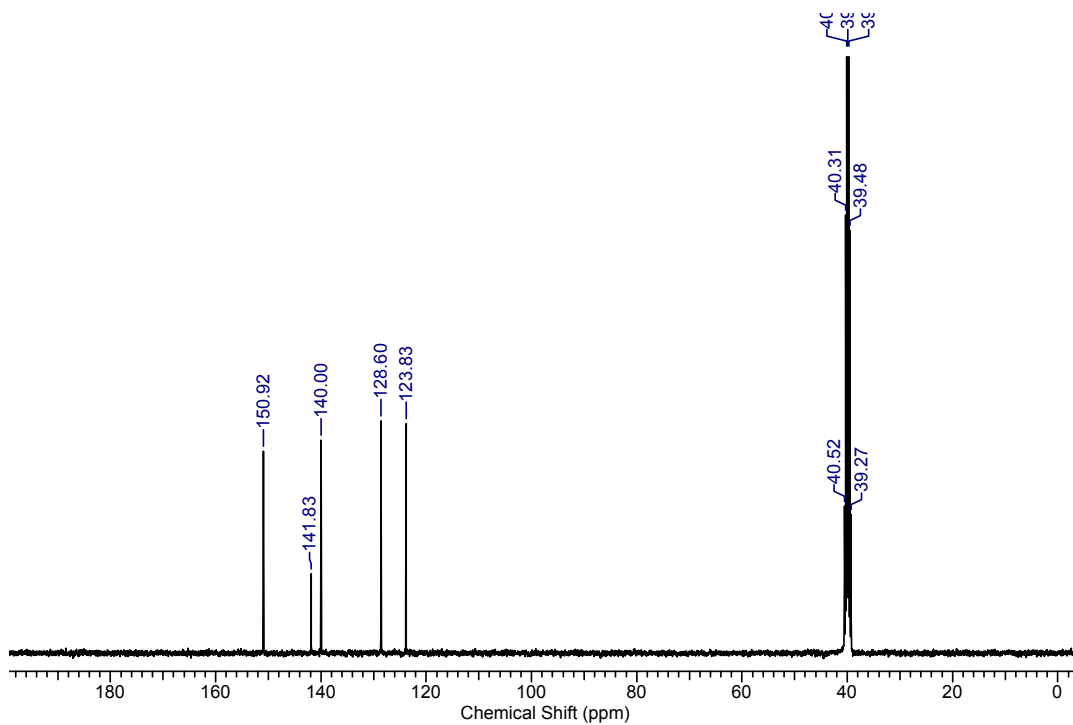


Fig. S18 ^{13}C -NMR spectrum of 2-bromopyridine oxide (Table 1, entry 9).

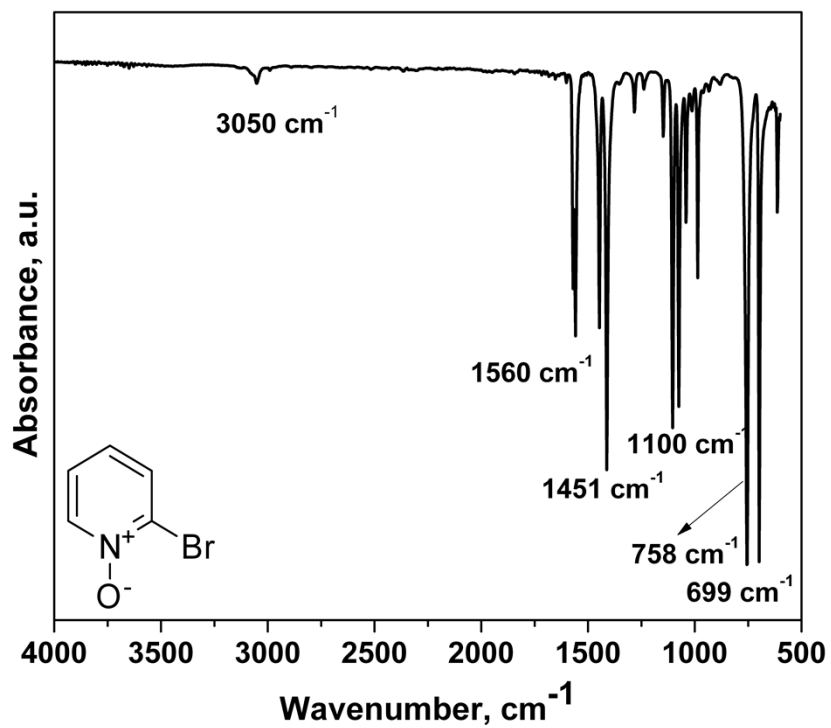


Fig. S19 FT-IR spectrum of 2-bromopyridine oxide (Table 1, entry 9).

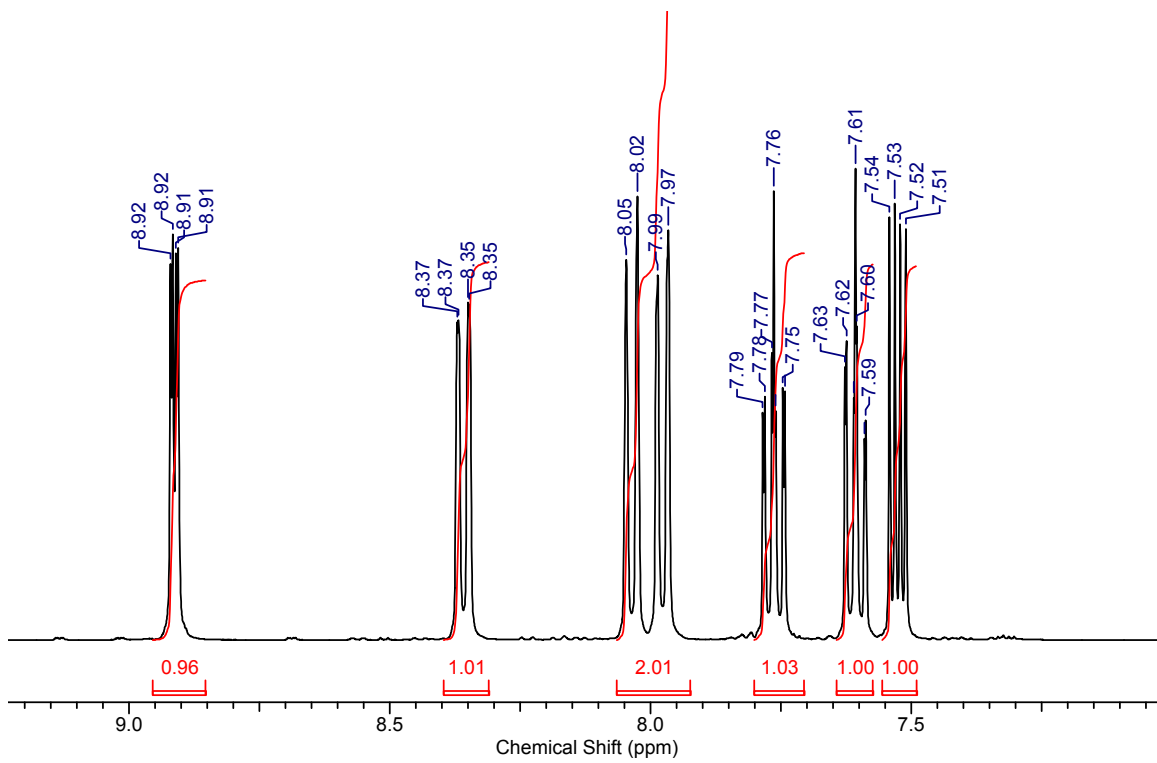
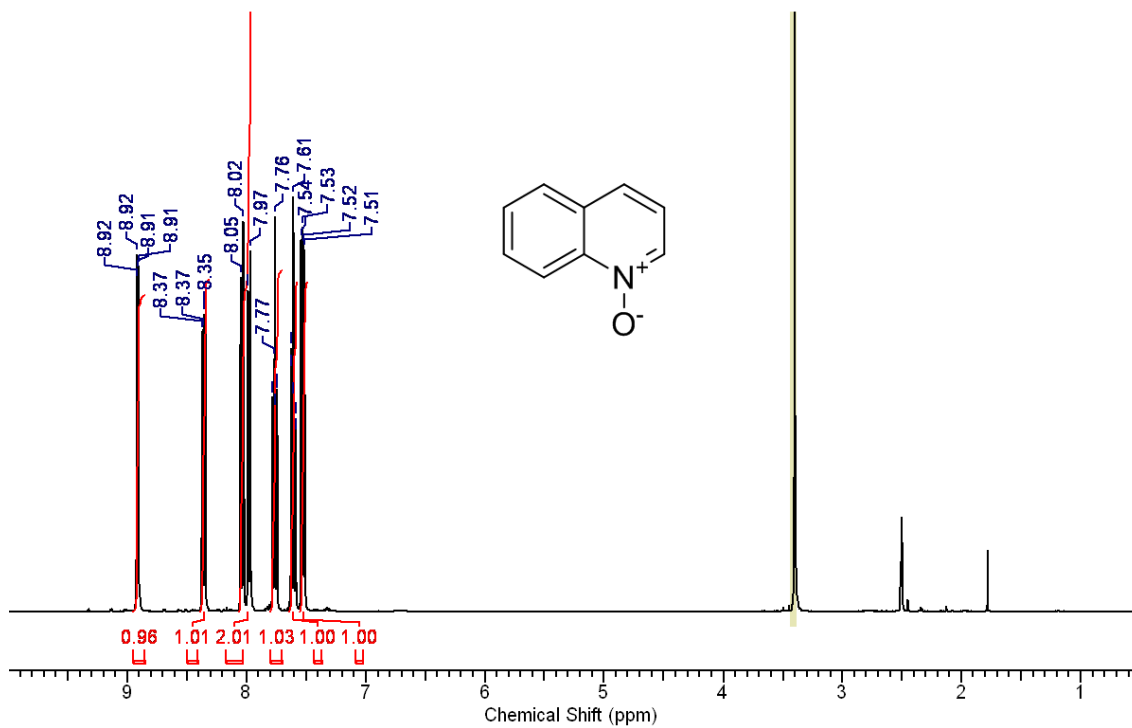


Fig. S20 $^1\text{H-NMR}$ spectrum of quinoline N-oxide (Table 1, entry 11).

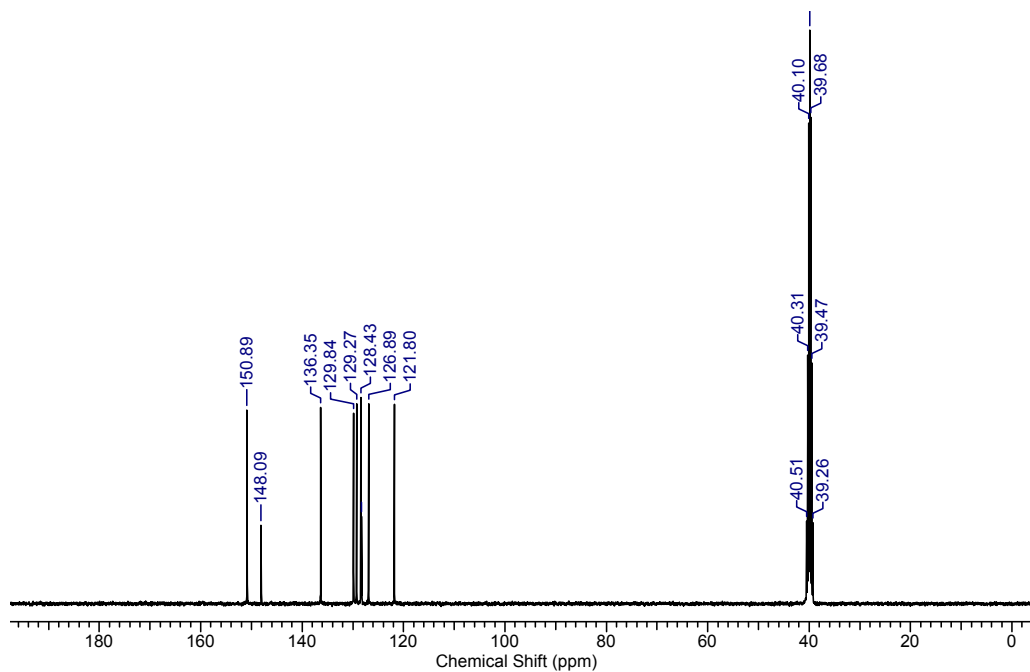


Fig. S21 ^{13}C -NMR spectrum of quinoline N-oxide (Table 1, entry 11).

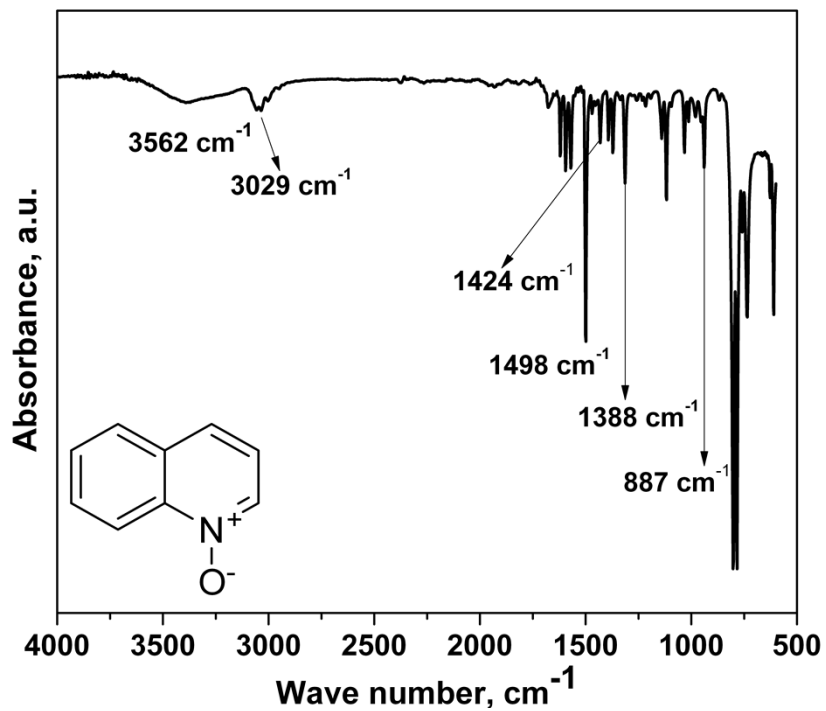


Fig. S22 FT-IR spectrum of quinoline N-oxide (Table 1, entry 11).

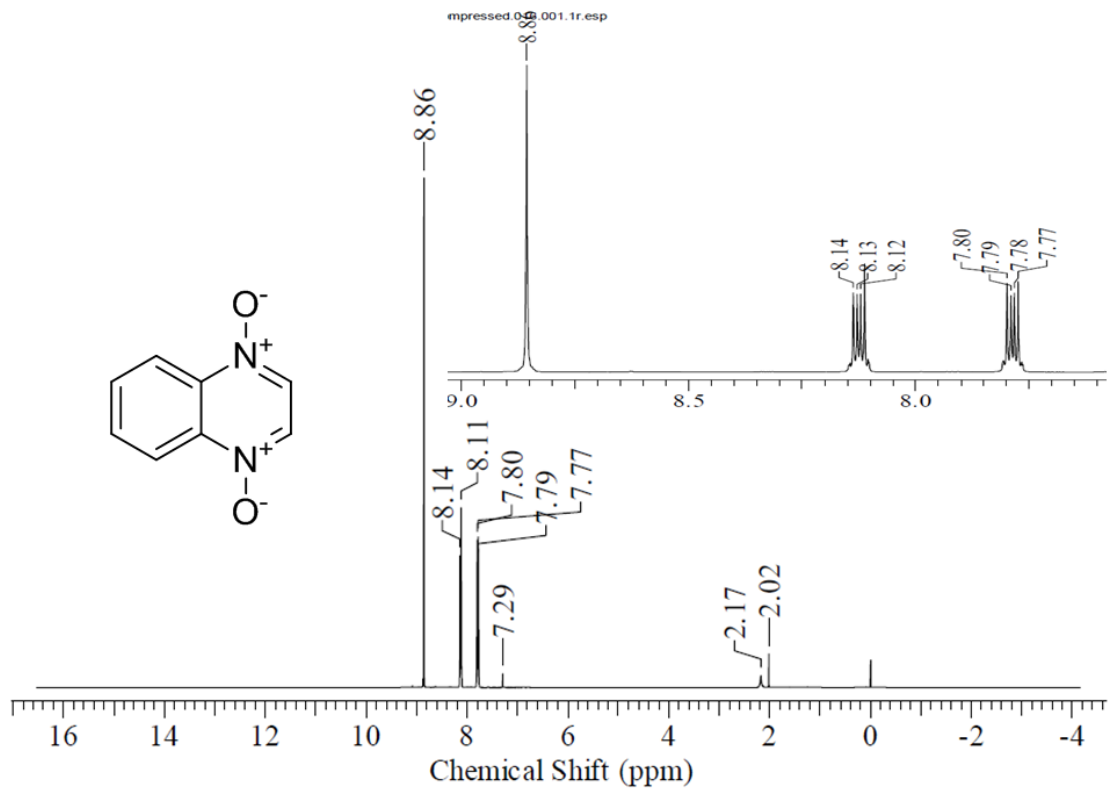


Fig. S23 $^1\text{H-NMR}$ spectrum of quinoxaline N-oxide (Table 1, entry 12).

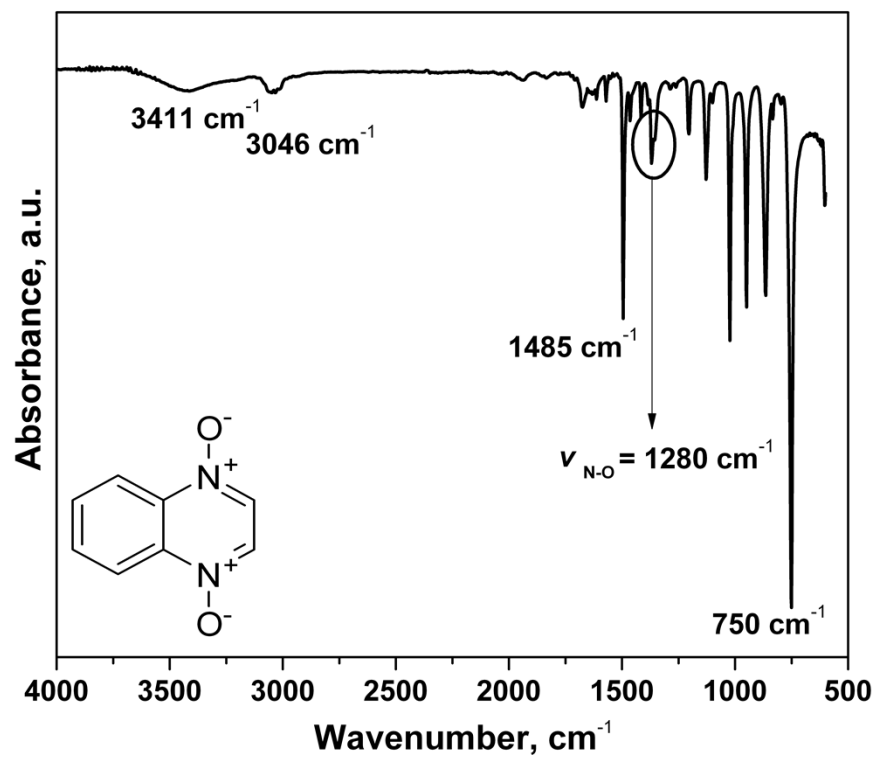


Fig. S24 FT-IR spectrum of quinoxaline N-oxide (Table 1, entry 12).

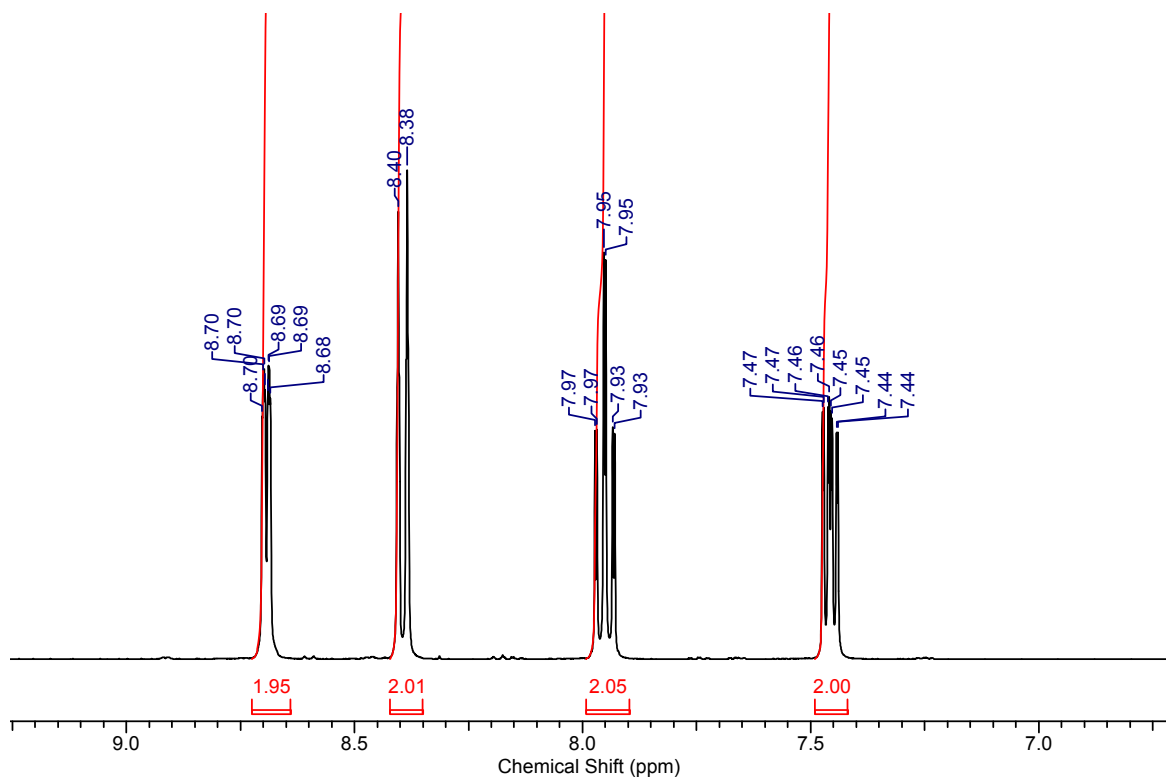
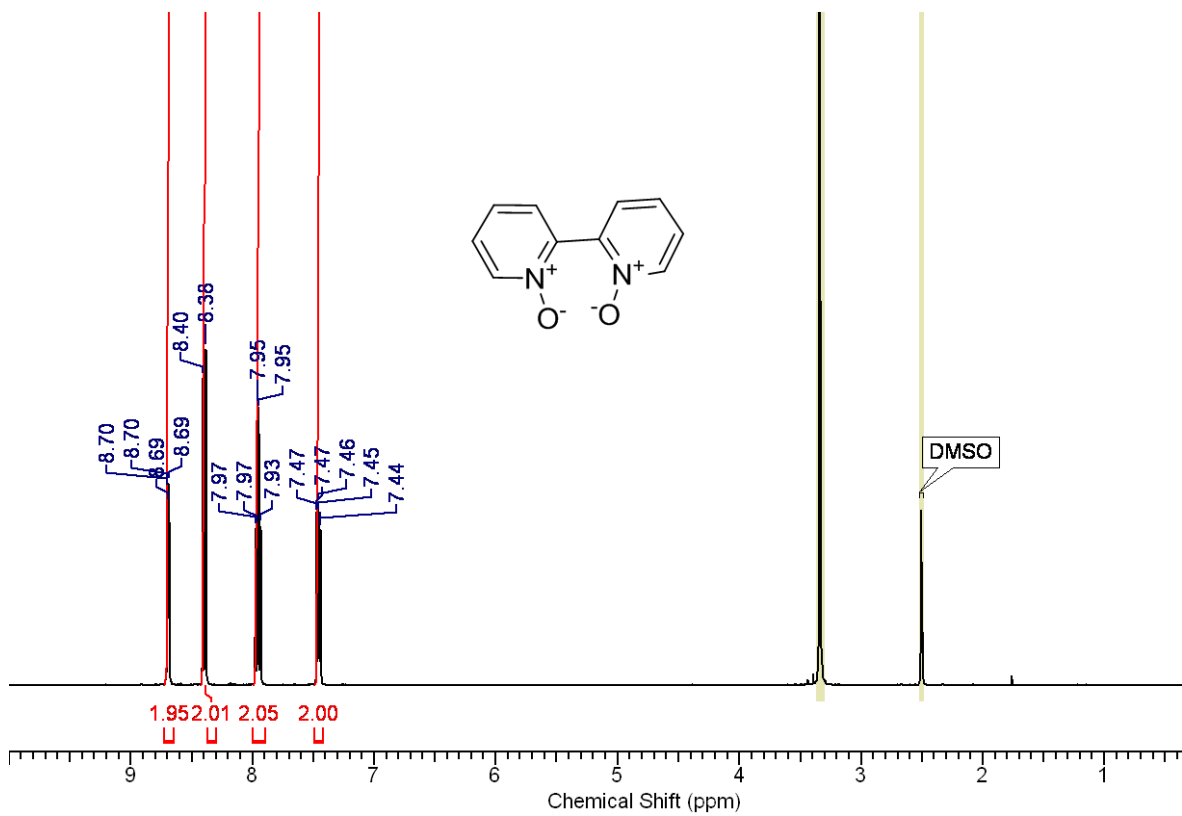


Fig. S25 ^1H -NMR spectrum of 2,2'-bipyridyl N-dioxide (Table 1, entry 13).

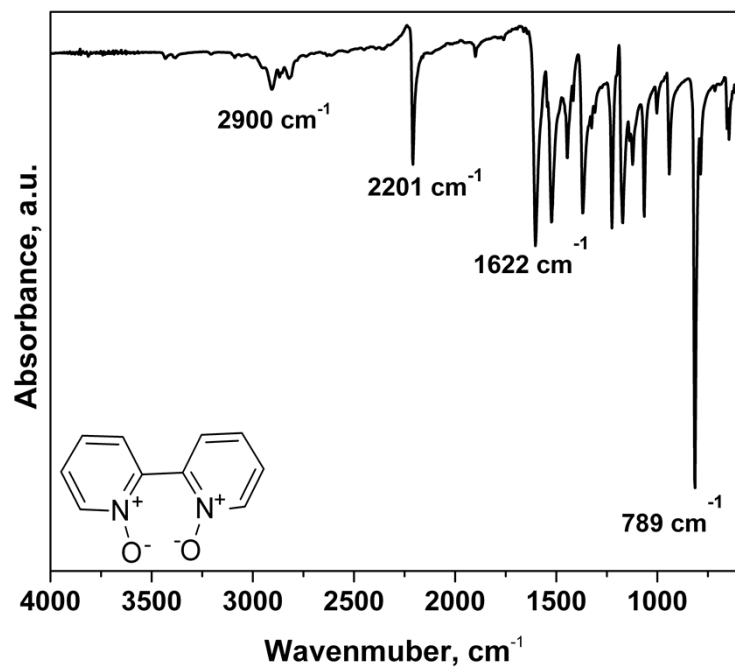


Fig. S26 FT-IR spectrum of 2,2'-bipyridyl N-dioxide (Table 1, entry 13).

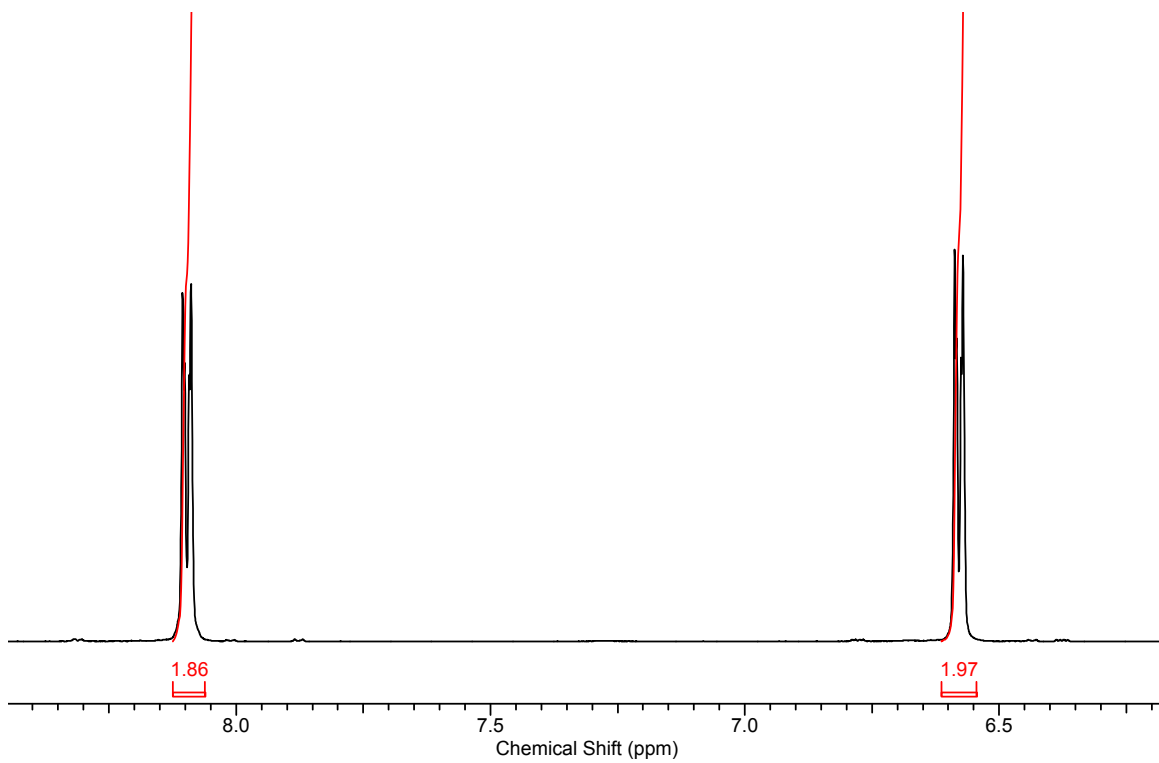
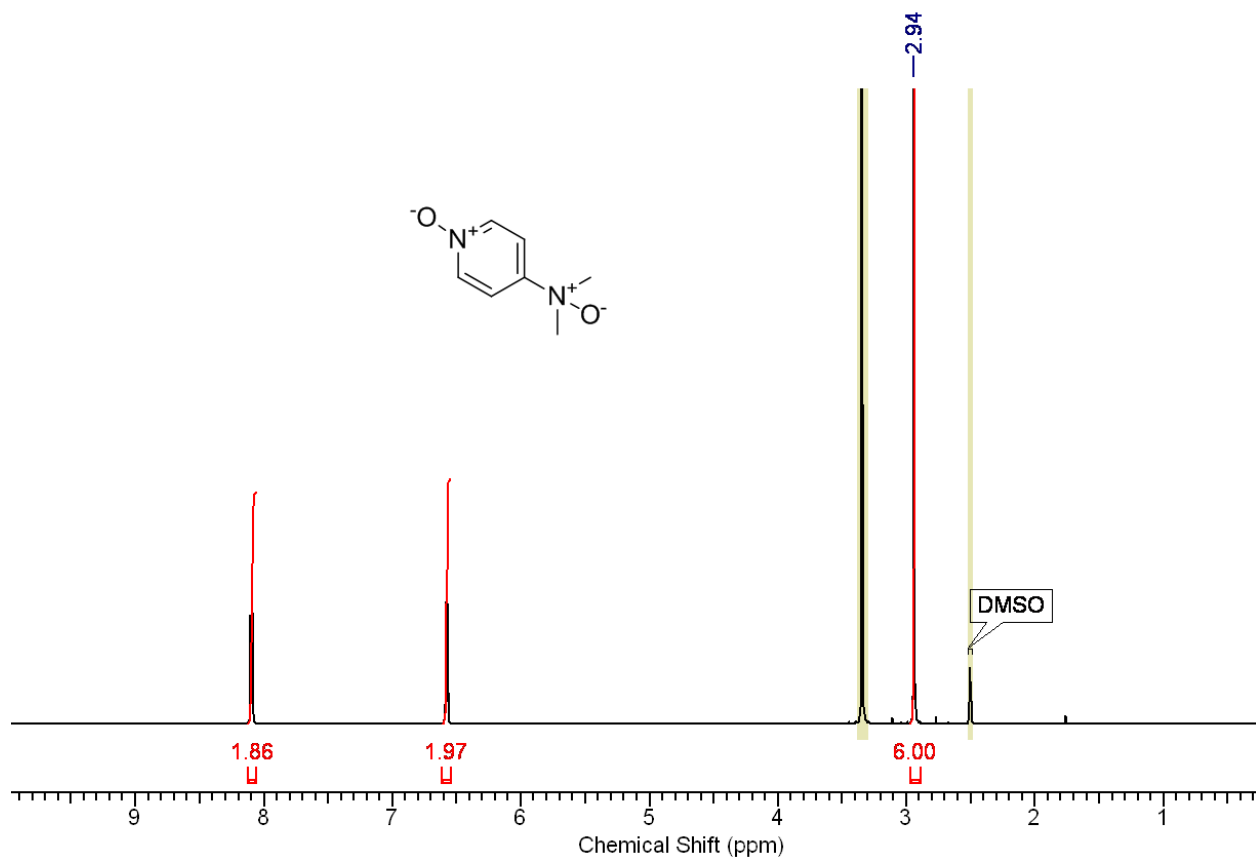


Fig. S27 ^1H -NMR spectrum of N,N-dimethylpyridin-4-amine N-dioxide (Table 1, entry 17).

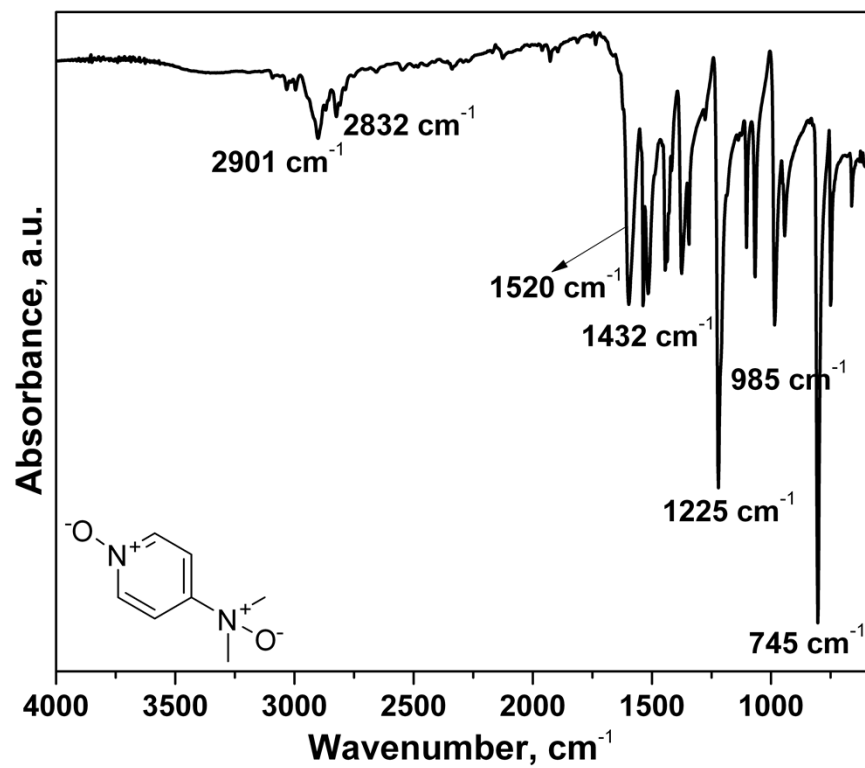


Fig. S28 ¹H-NMR spectrum of N,N-dimethylpyridin-4-amine N-dioxide (Table 1, entry 17).

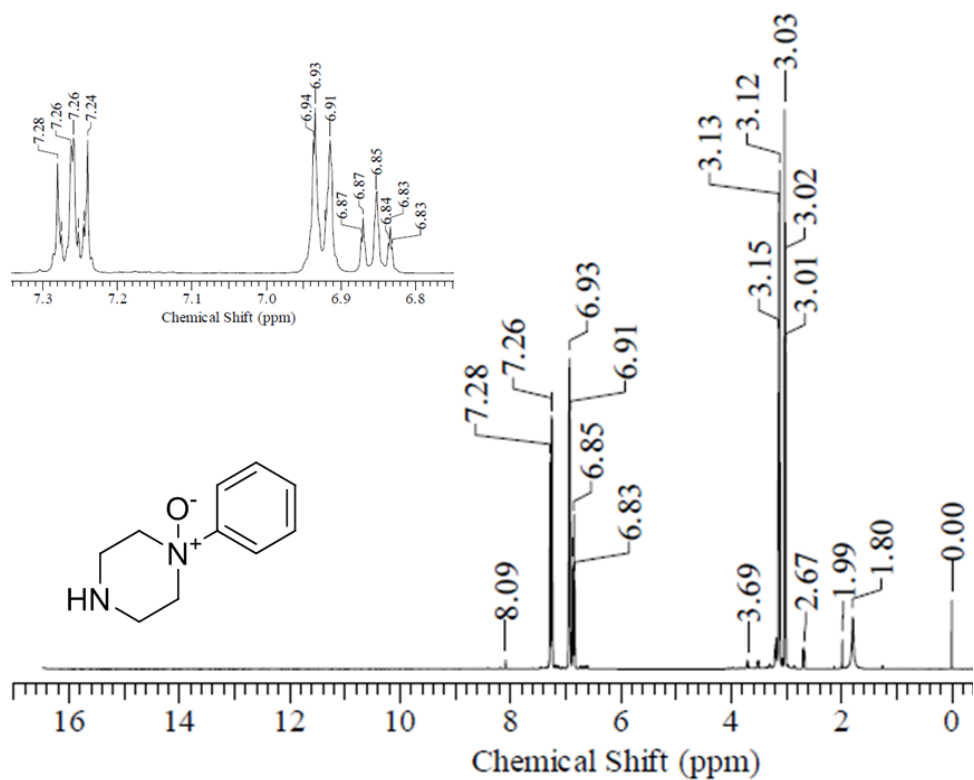


Fig. S29 $^1\text{H-NMR}$ spectrum of 1-phenylpiperazine N-dioxide (Table 1, entry 18).

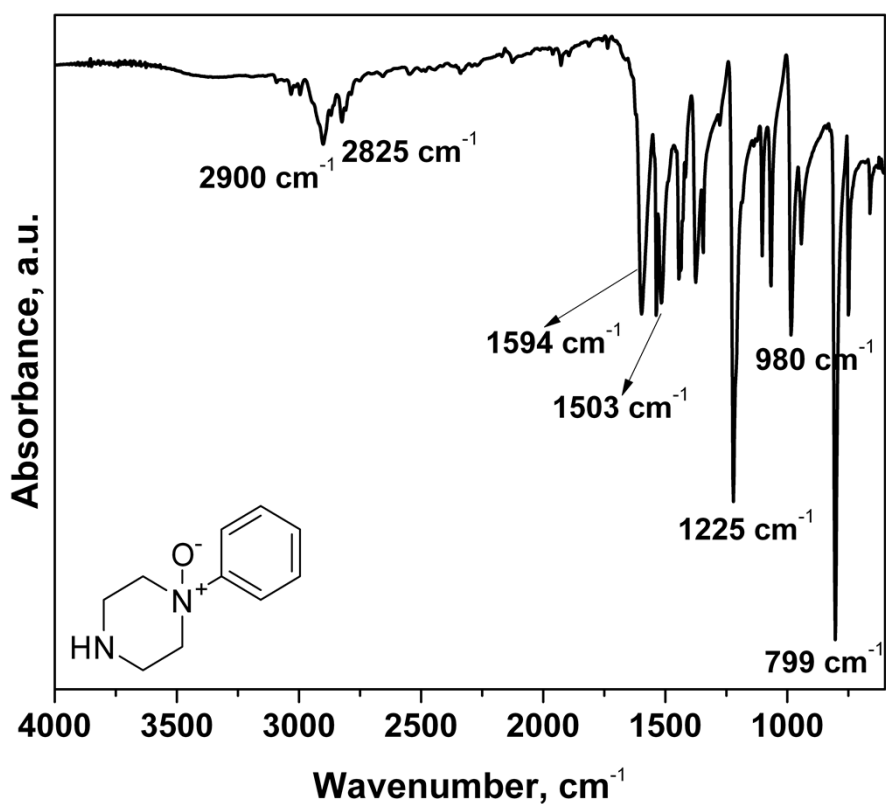


Fig. S30 FT-IR spectrum of 1-phenylpiperazine N-dioxide (Table 1, entry 18).