# Supplementary Information

## Synthesis, characterization and catalytic activity of zinc oxide nanoparticles functionalized with metallo-thoiosemicarbazones

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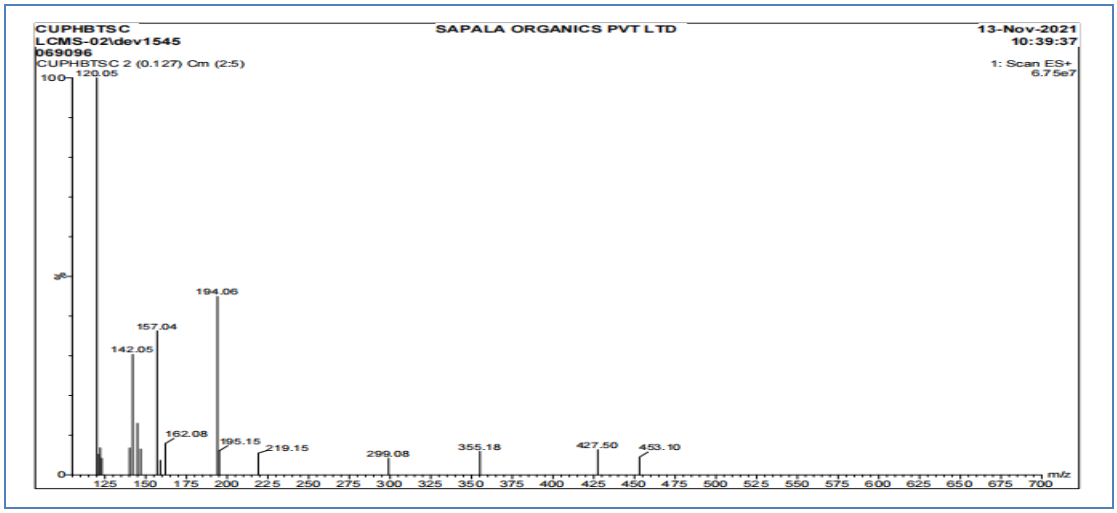


**Figure S1.** Mass spectrum of $Cu(BTSC)_2$ complex

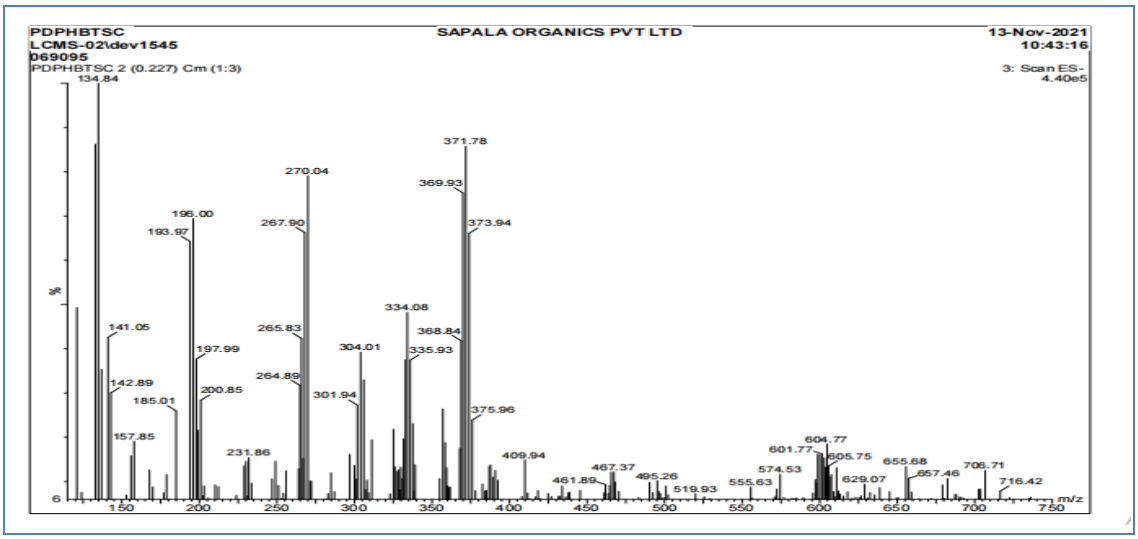


**Figure S2.** Mass spectrum of $Pd(BTSC)Cl_2$ complex.

## The reduction mechanism

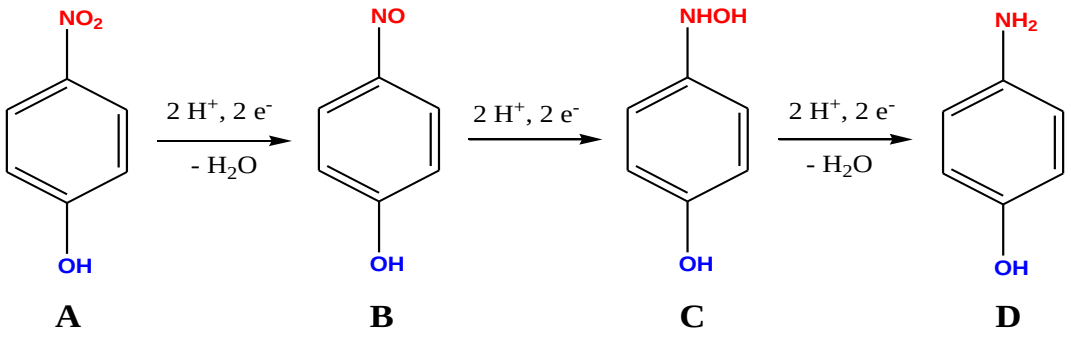


**Figure S3.** Mechanism for the reduction of 4- NP to 4 -AP

(A) 4-Nitrophenol, (B) 4-Nitrosophenol, (C) 4-Hydroxylamino phenol and (D) 4-Aminophenol

The reduction of 4-NP to 4-AP is thermodynamically favourable ($E_0$ = -0.76 V Vs NHE) and $H_3BO_3/BH_4^-$ ($E_0$ = -1.33 V Vs NHE) produced a large potential difference (large energy gap) between 4-NP & $BH_4^-$ makes the reaction kinetics slower. The added metal nanoparticles adsorb -ve ions and able to transfer electrons donated by borohydride ions to nitro group of 4-NP, which is expected to decrease the kinetic barrier and thus catalyse the reduction reaction.