Electronic Supplementary Information

Synthesis of glucose-mediated Ag - γ-Fe_2O_3 multifunctional nanocomposites in aqueous medium - a kinetic analysis of their catalytic activity for 4-nitrophenol reduction

Mandeep Kaloti, [a,b] *Anil Kumar* [a,b*] *and Naveen K. Navani* [a,c]

[a] Centre of Nanotechnology, Indian Institute of Technology Roorkee, Roorkee-247667, India

[b] Department of Chemistry, Indian Institute of Technology Roorkee, Roorkee-247667, India. E-mail: anilkfcy@iitr.ac.in

[c] Department of Biotechnology, Indian Institute of Technology Roorkee, Roorkee-247667, India

Results:

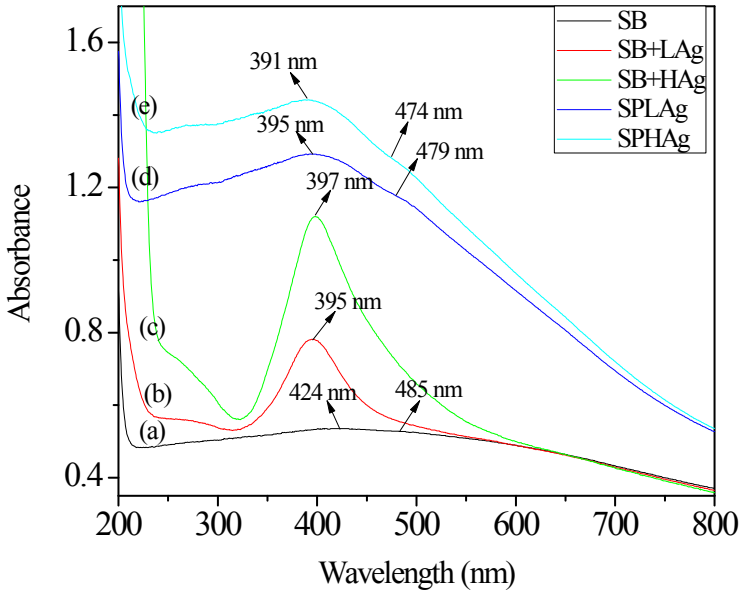

Figure S1. UV-visible spectra of: SB (a); additive spectrum of SB and 0.6 µM Ag NPs (b); additive spectrum of SB and 6.4 µM Ag NPs (c); SPLAg (d) and SPHAg (e).

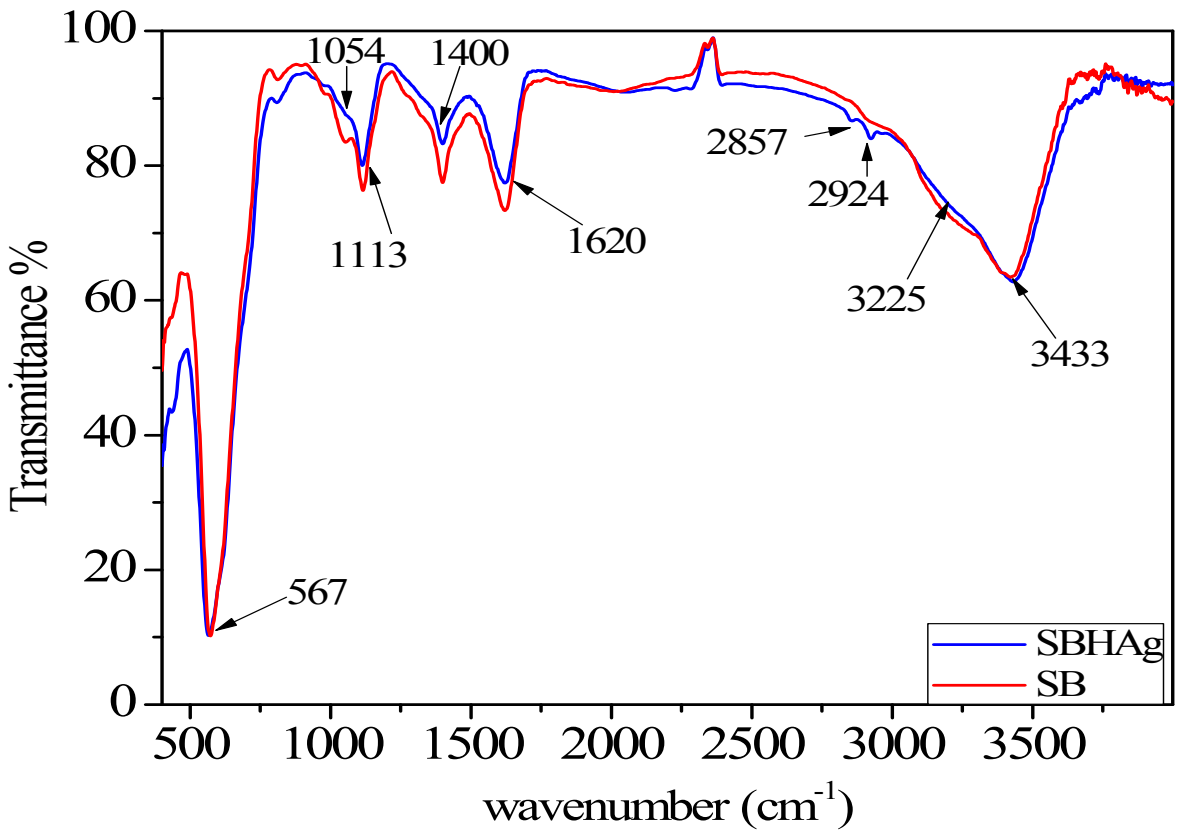

Figure S2. FTIR spectra of SB (—) and SPHAg (—).

Table S1: FTIR data (cm^{-1}) of SB and SPHAg

Group/ Moeity	**SB**	**SPHAg**
OH stretch	3424	3433
	3250	3225
CH stretch		2924
		2857
ν_4 NH stretch	1620	1620
asym SO_4^{2-}	1398	1400
	1312	1317
	1116	1113
sym SO_4^{2-}	1054	disappeared
	978	973 (diminishes)
SO_4^{2-}	810	808 (diminishes)
Fe-O	618	620
	571	567
	436	437

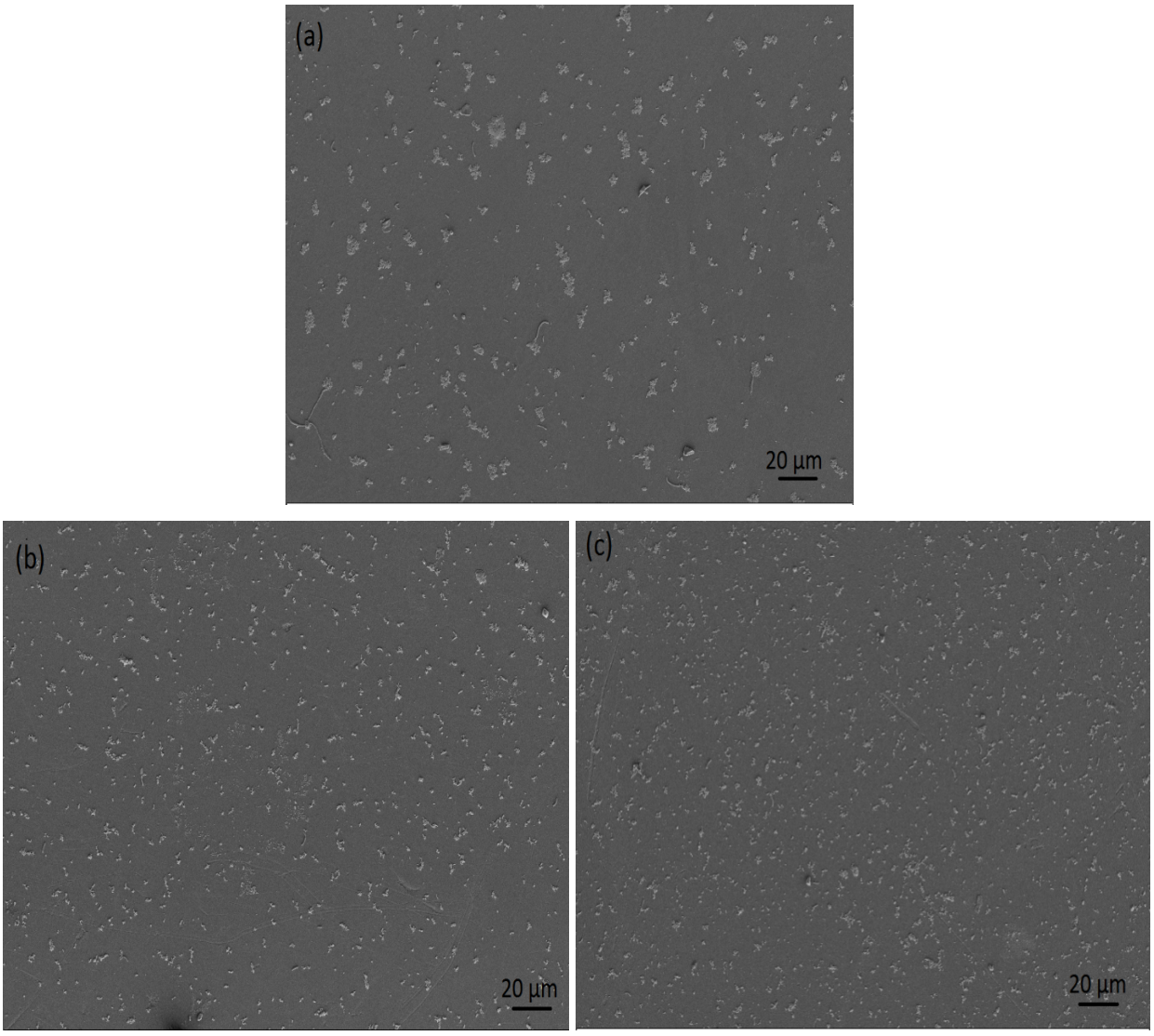

Figure S3. Fe-SEM images of SB: (a), SPLAg (b) and SPHAg (c) at low magnification depicting the effect of increase in silver.

The increasing addition of Ag results in an increase in the dispersity, increased organization of iron oxide nanoclusters associated with a decrease in the size of nanoparticles.

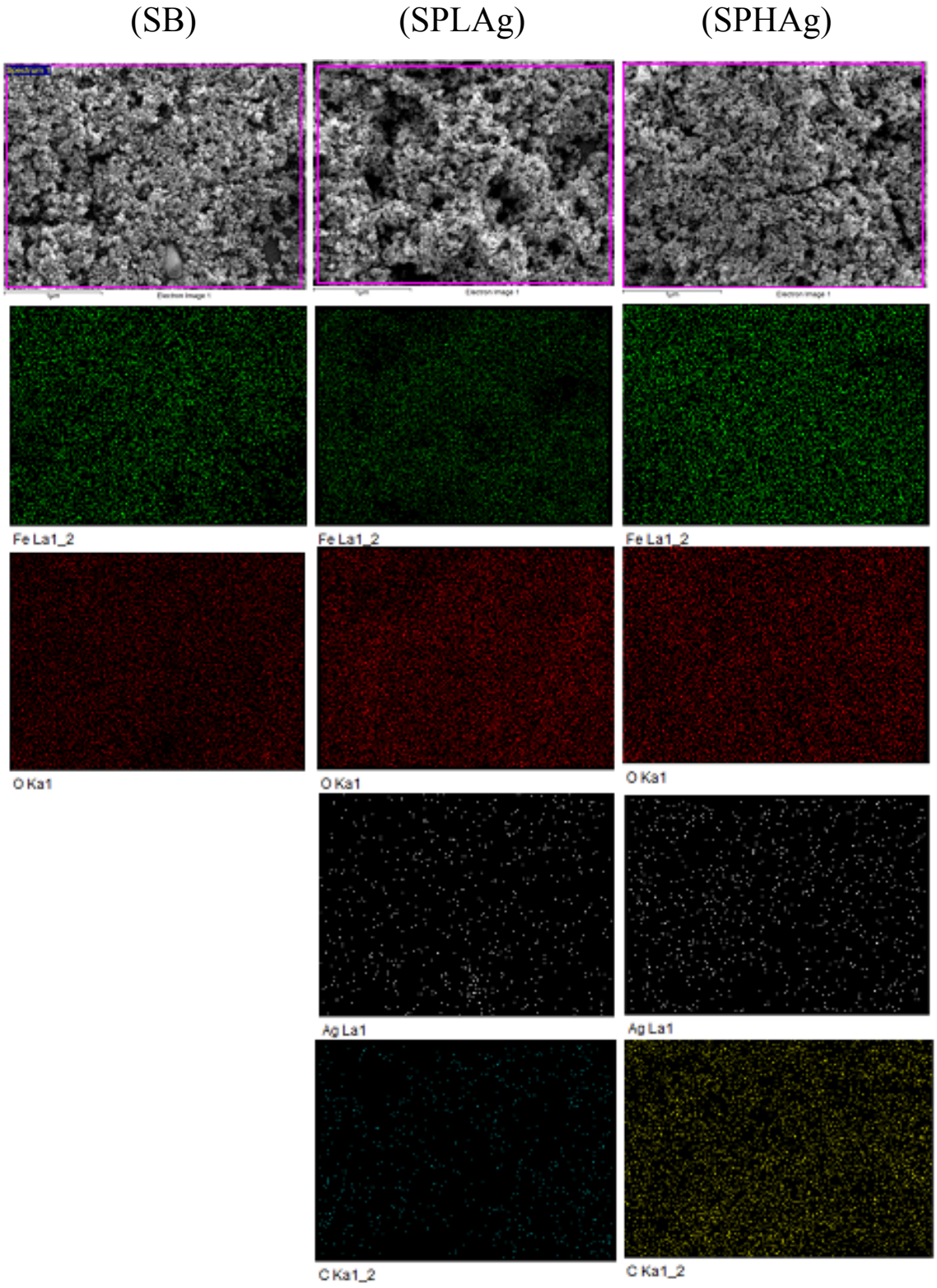

Figure S4. Elemental mapping of Fe-SEM images of SB, SPLAg and SPHAg: green (Fe), red (O), grey (Ag) and cyan (C).

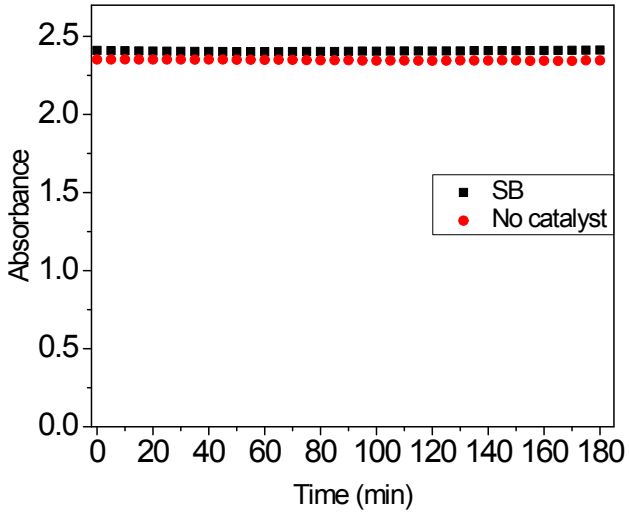

Figure S5. Control experiments at 30^0 C: Change in absorbance of 4-Nip as a function of time containing [SB] = 371 mM, [$NaBH_4$] = 68.22 mM, [4-Nip] = 161.27 μM; Change in absorbance of 4-Nip as a function of time in absence of SB matrix and Ag containing: [$NaBH_4$] = 68.22 mM, [4-Nip] = 161.27 μM.

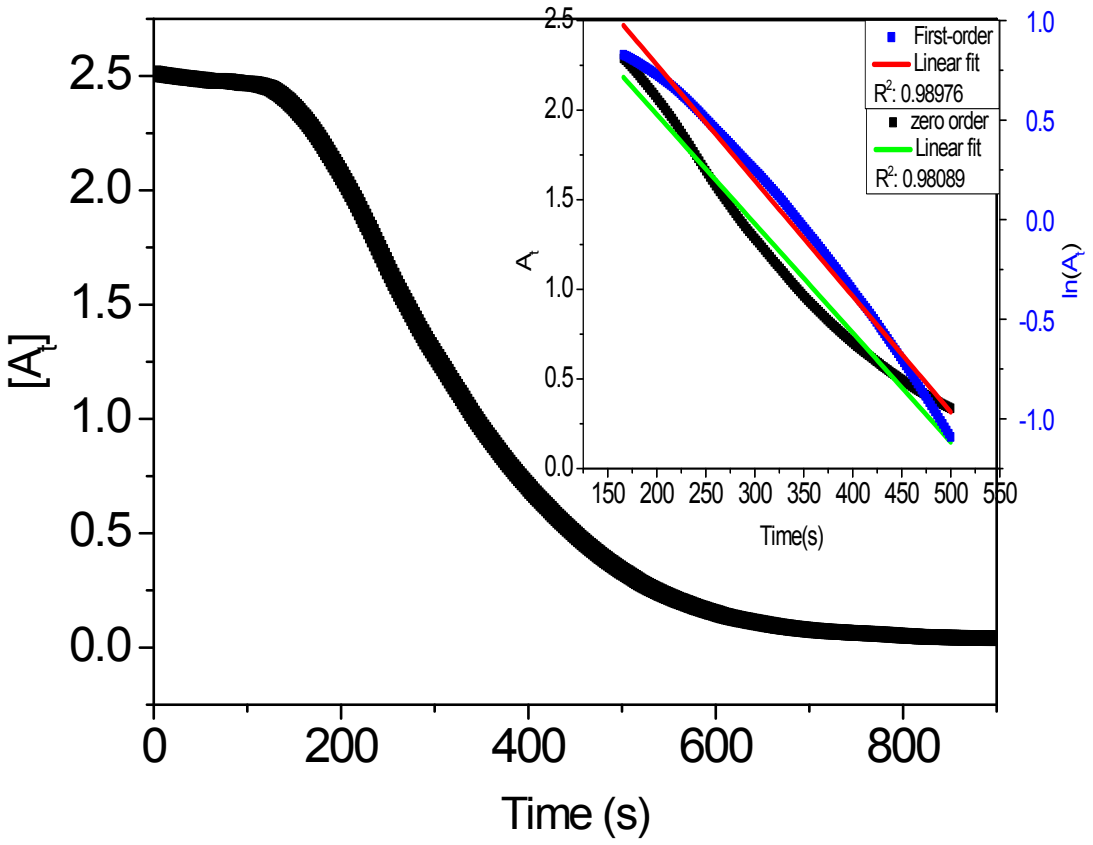

Figure S6. Kinetic trace for the reduction of 4-Nip at an intermediate concentration of 2.4 μM Ag containing [4-Nip] = 161.27 μM, [$NaBH_4$] = 68.22 mM at 30^0 C.

It exhibits a change in the kinetic behavior as this data could neither be fitted in the first-order nor in zero order kinetics (Inset: Figure S6).

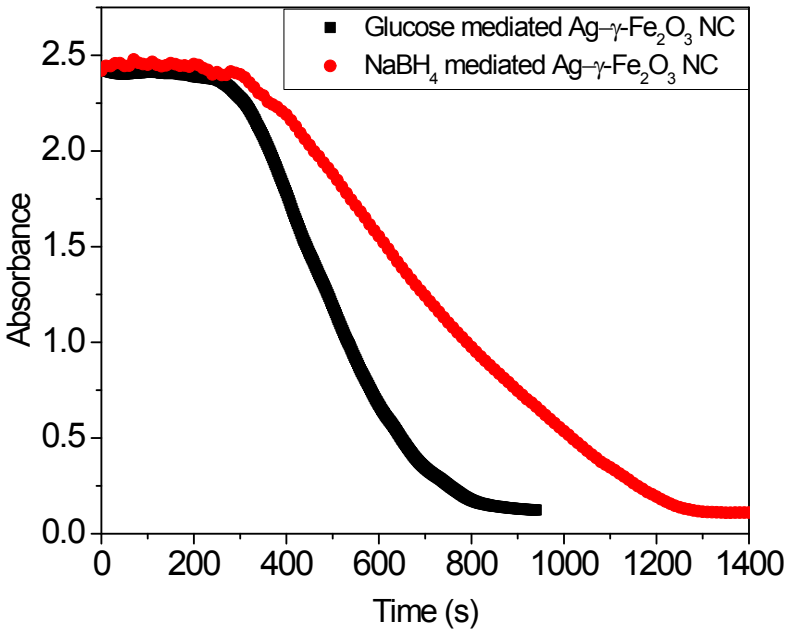

Figure S7: Control experiments: Kinetic traces of the reduction of 4-Nip as a function of time depicting the effect of reducing agent used ($NaBH_4$ and glucose) for in-situ generation of Ag NPs on the surface of matrix containing: [$NaBH_4$] = 68.22 mM, [4-Nip] = 161.27 μM and [Ag] = 2.8 μM.