Electronic Supplementary Information

Hierarchical synthesis of silver monoliths and their efficient catalytic activity for the reduction of 4-Nitrophenol to 4-Aminophenol.

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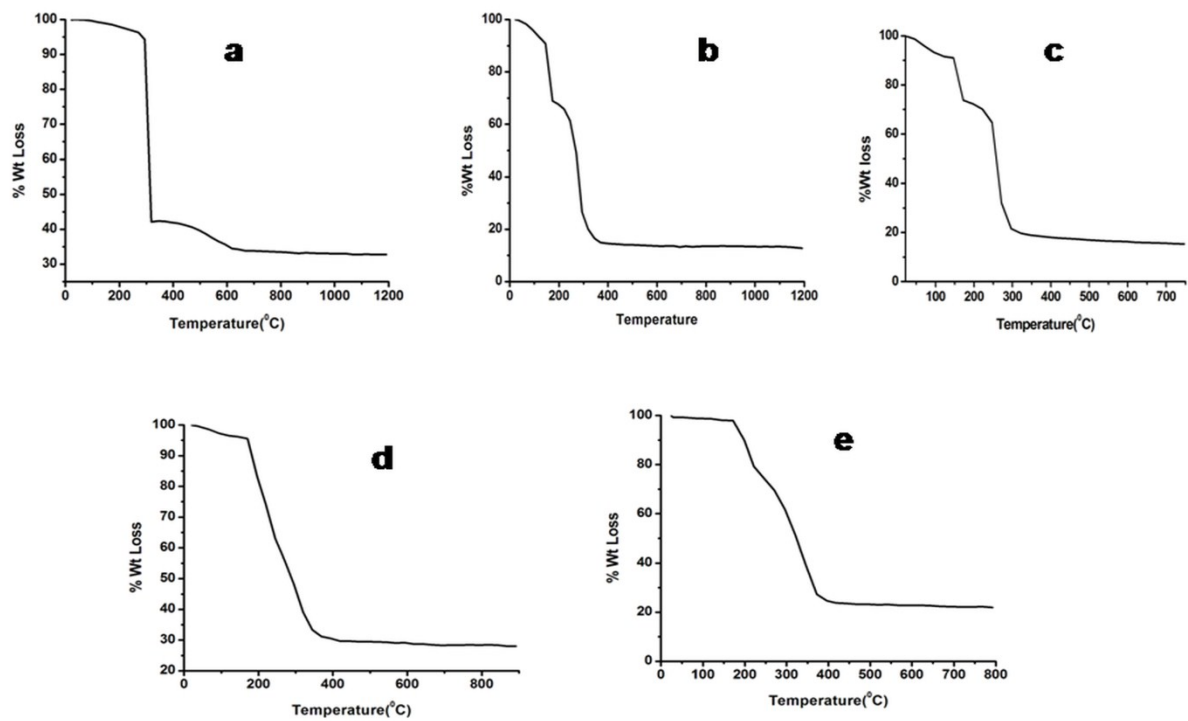*faridkhan58@yahoo.com;farid.fk@rediffmail.com

Fig. S1. TGA Graphs of Silver monoliths with Triton X-705 with and without additives. (a) Ag/Triton X-705 monolith, (b) Ag/Triton X-705/dextran monolith, (c) Ag/Triton X-705/SiNPs monolith, (d) Ag/Triton X-705/TMB monolith, (e) Ag/Triton X-705/Fe$_3$O$_4$NPs.
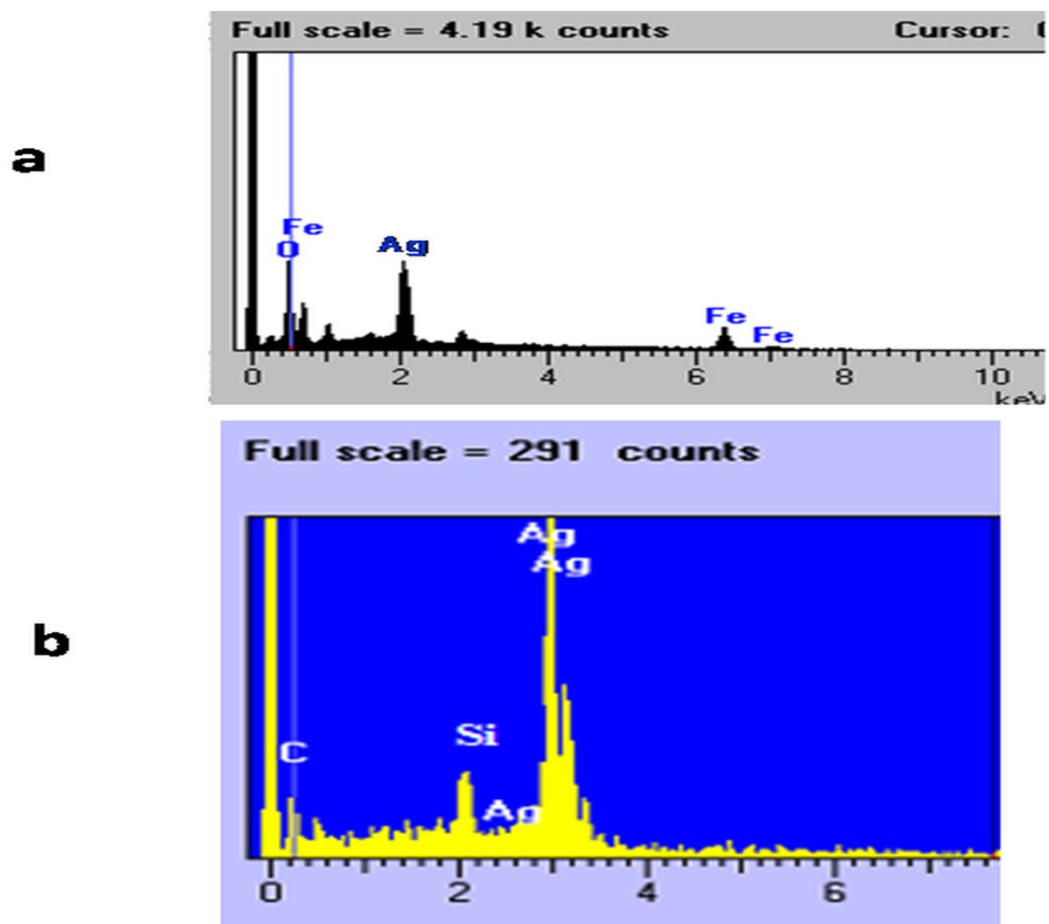
Full scale = 4.19 k counts   **Cursor:**

a

Fe
O
Ag

Fe
Fe

0   2   4   6   8   10
keV

Full scale = 291   counts

b

Ag
Ag

C

Si

Ag

0   2   4   6

Fig. S2. Energy dispersive X-ray analysis of silica and Fe_3O_4 nanoparticles in silver monoliths. (a) Iron nanoparticles in Ag/Triton X-705/Fe_3O_4 nanoparticles monolith, (b) Silica nanoparticles in Ag/Triton X-705/silica nanoparticles monolith.
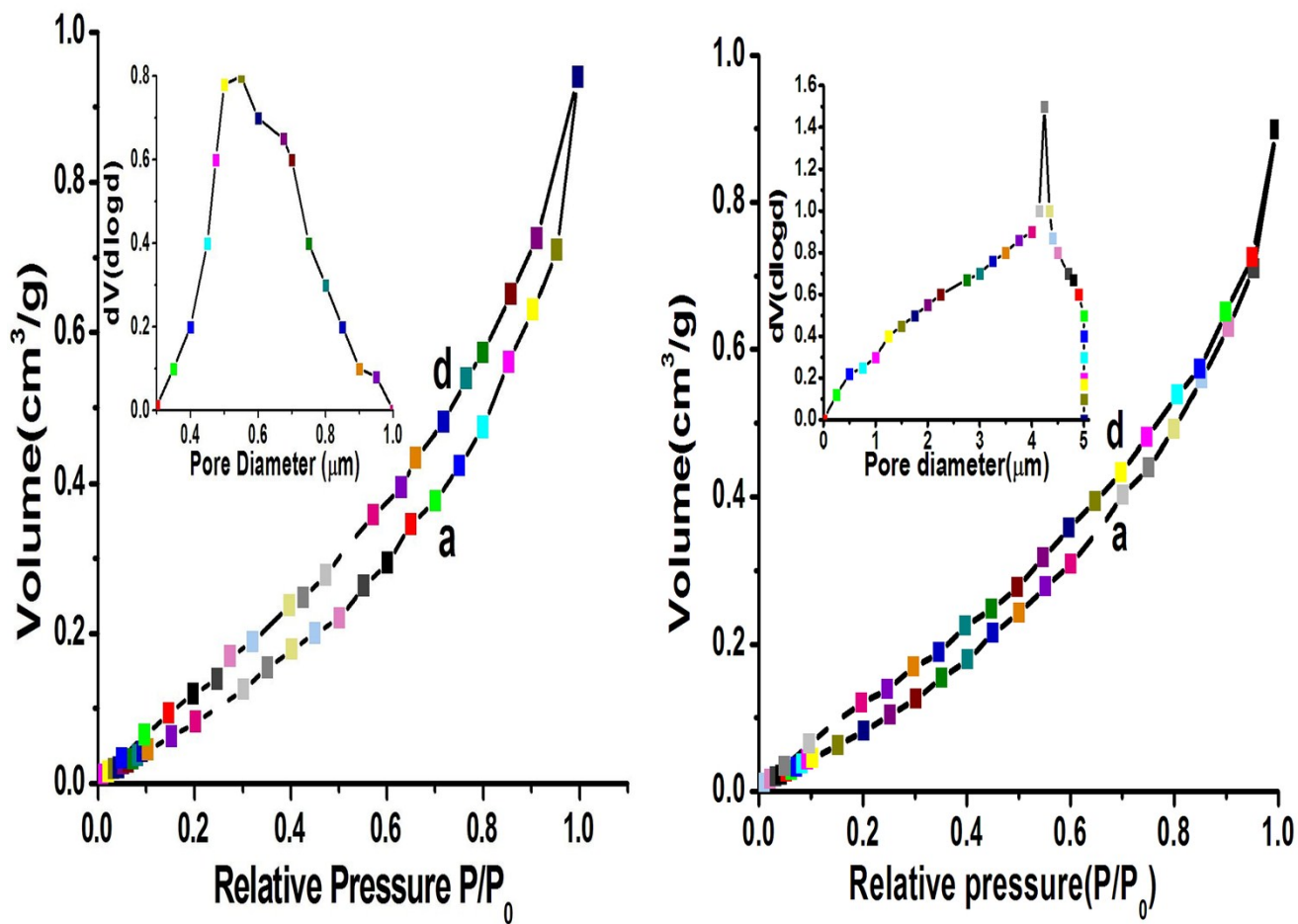
Fig. S3. N_2 Sorption & desorption curves of silver monoliths. (a) Ag/Triton X-705/SiNPs, (b) Ag/Triton X-705/Fe_3O_4 NPs composites. The insets show the pore size distributions.
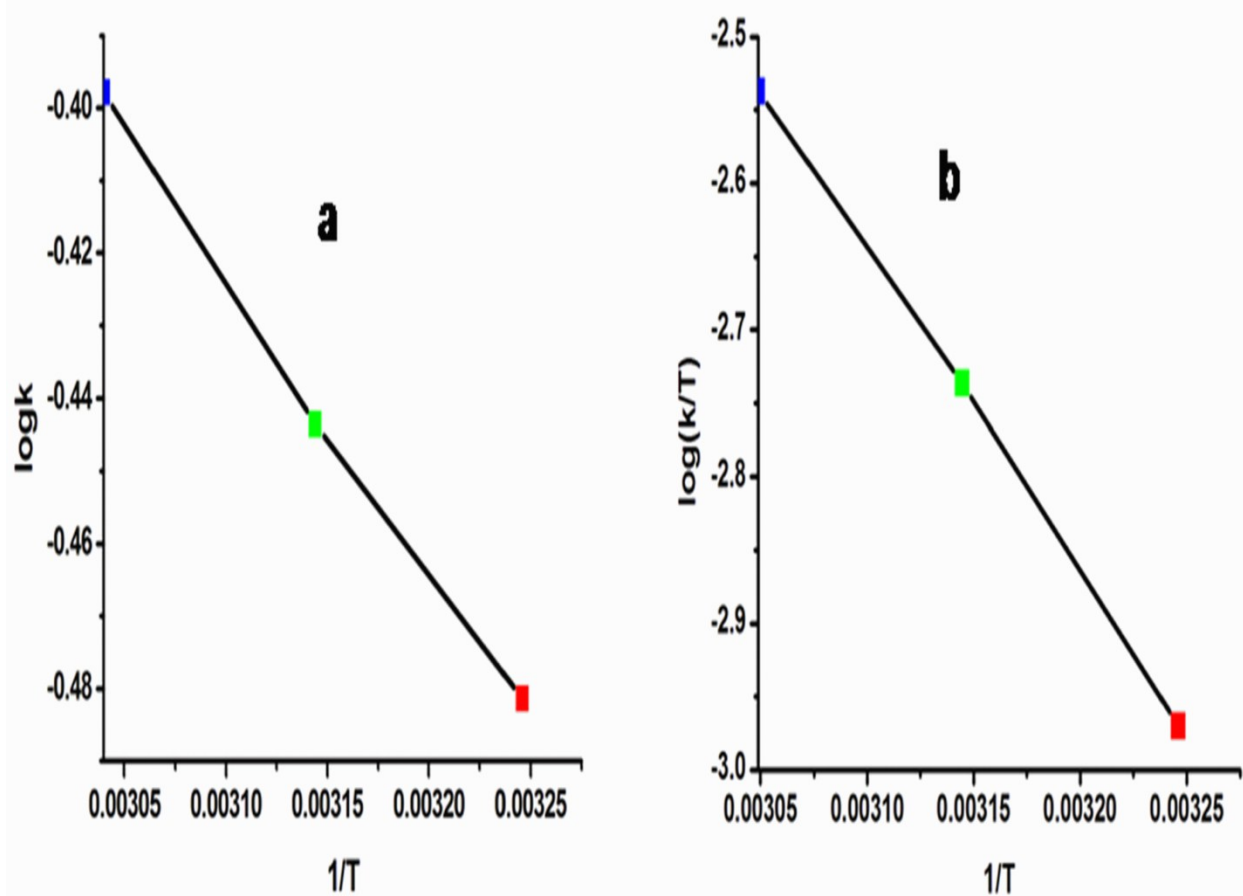
Fig. S4. Plots for activation Energy (E_a), and thermodynamic parameters ($\Delta H^\#$), ($\Delta S^\#$) of catalyst Ag/Triton X-705/SiNPs for the reduction of 4-NP to 4-AP. (a) Plot between log k Vs 1/T, (b) log k/T Vs 1/T.
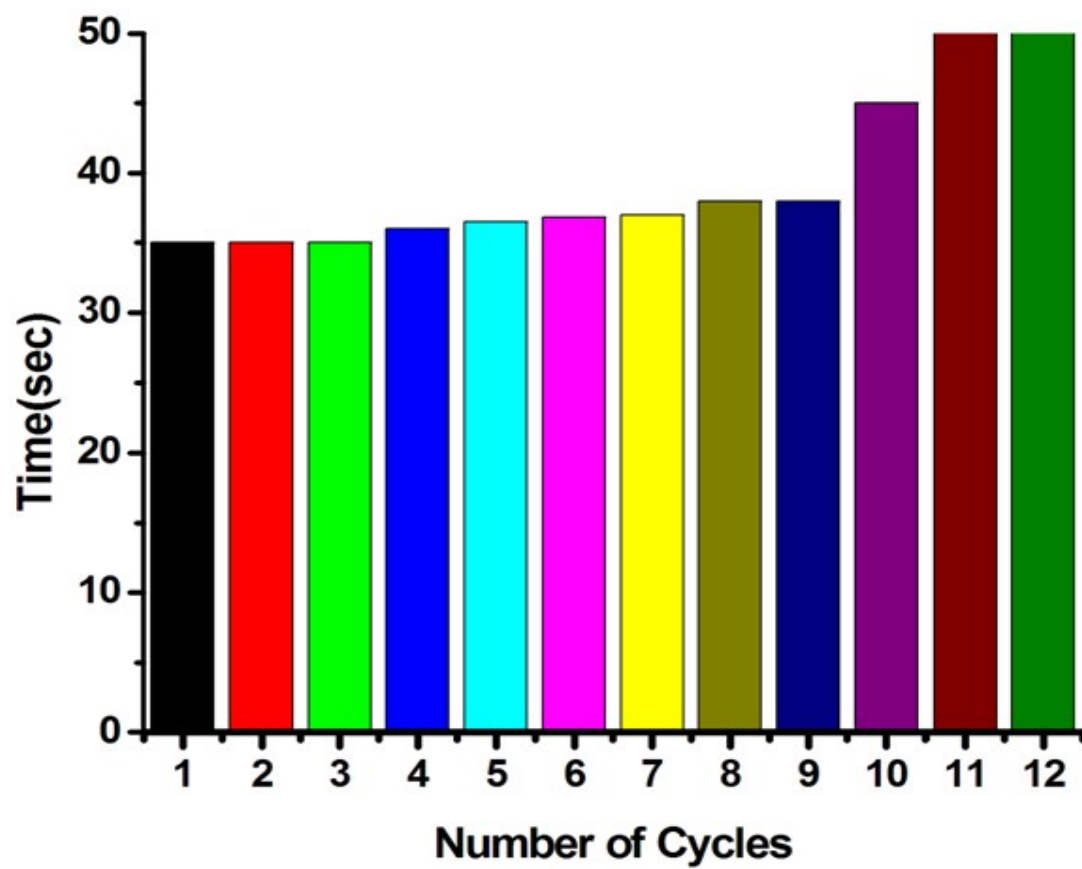
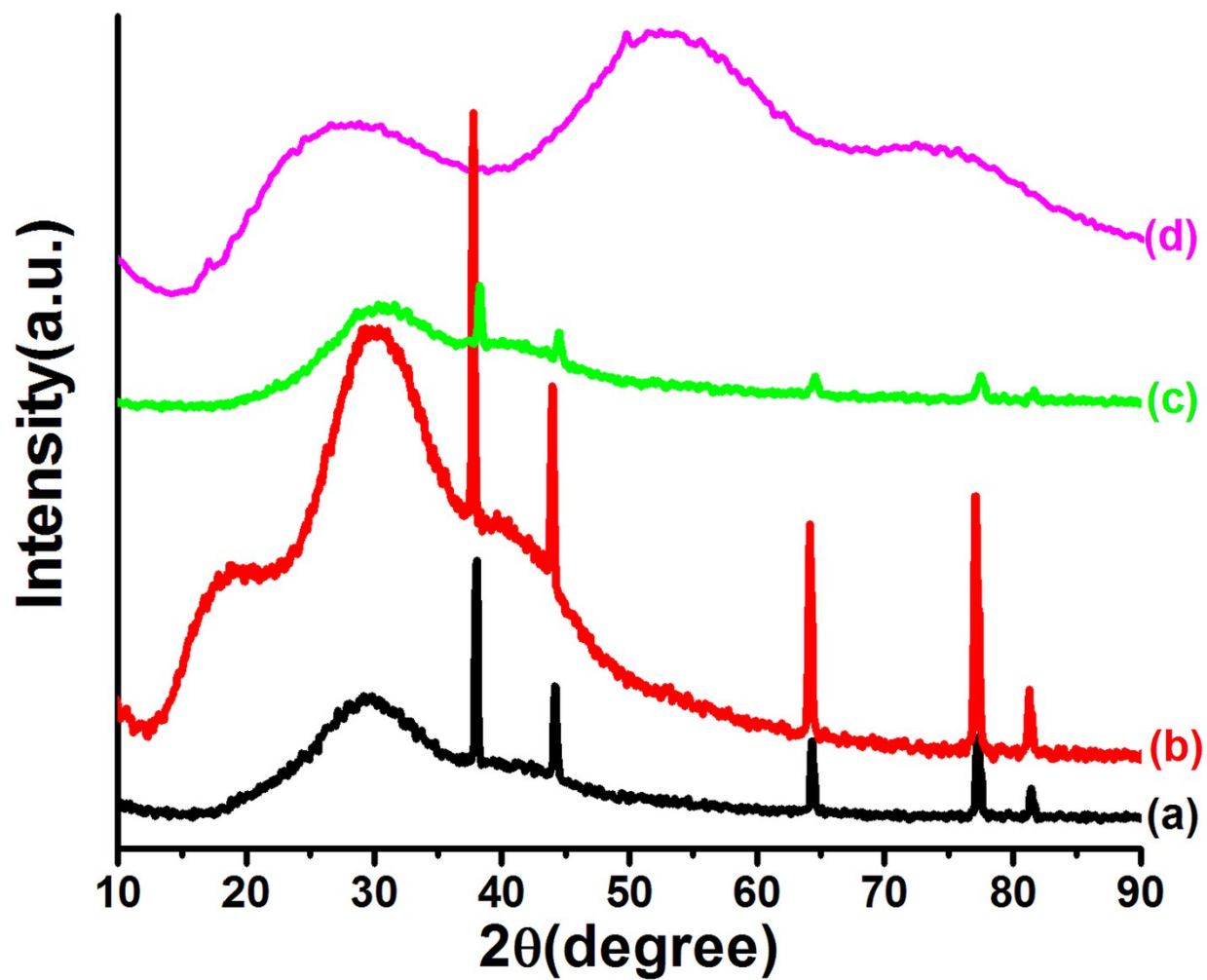**Fig. S5.** Recyclability of Ag/Triton X-705/SiNPs composite.

Fig. S6. XRD pattern of silver monoliths prepared using Triton X-705 gel template. (a) Ag/Triton X-705, (b) Ag/Triton X-705/dextran, (c) Ag/Triton X-705/TMB, (d) PMMA sample holder.

Table S 1. The Rate constants for the reduction of 4-NP at different temperatures & activation parameters by catalyst Ag/Triton X-705/silica NPs composite.

Compounds	Temp (°C)	k(sec^{-1})	E_a (kjmol^{-1})	$\Delta H^{\neq}$ (kjmol^{-1})	$\Delta S^{\neq}$ (J mol^{-1}K^{-1})	$\Delta G^{\neq}$ kJmol^{-1}	Temperature coefficient
	25	0.330				46.729	1.7666
4-nitrophenol	35	0.583	50.524	46.781	-141.109	48.139	
	45	0.952				49.551	1.6329

Reaction conditions: 50μL of [4-NP] = [5.04 × 10^{-4} moles/L], [0. 1M] NaBH$_4$, 0.006 g catalyst.