Electronic Supplementary Material (ESI) for Journal of Materials Chemistry

Electronic Supplementary Information

In Situ Formation of Chiral Core-Shell Nanostructures with Raspberry-Like Gold Core and Dense Organic Shells using Catechin and Their Catalytic Application

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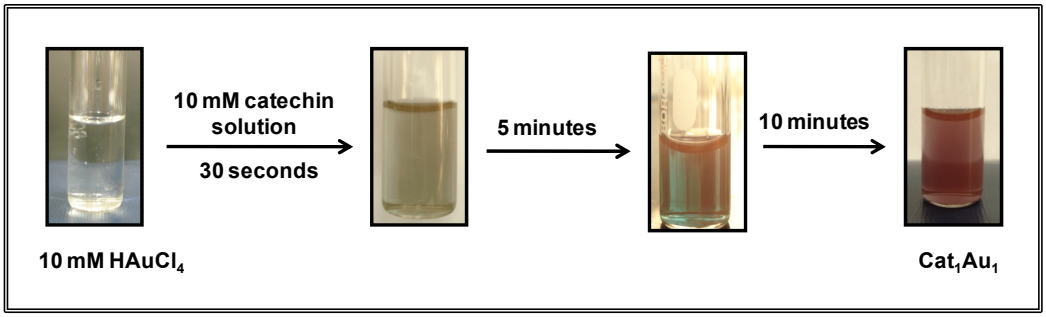

Figure S1: Photographs showing color changes at different stages during the synthesis of core-shell nanostructures.

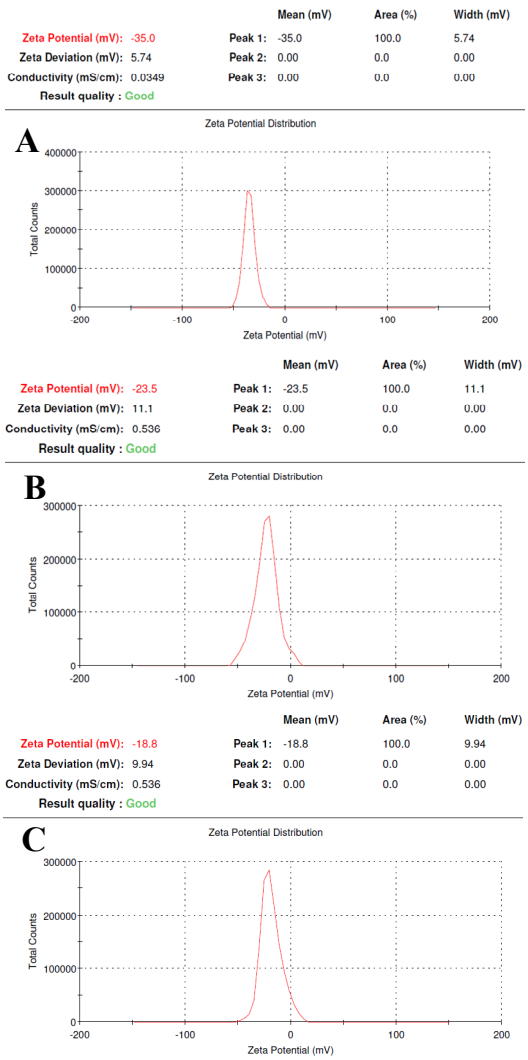

Figure S2. Zeta potential of different samples (A) Cat_1Au_1 (B) Cat_2Au_1 (C) Cat_3Au_1 as measured from their aqueous suspensions.

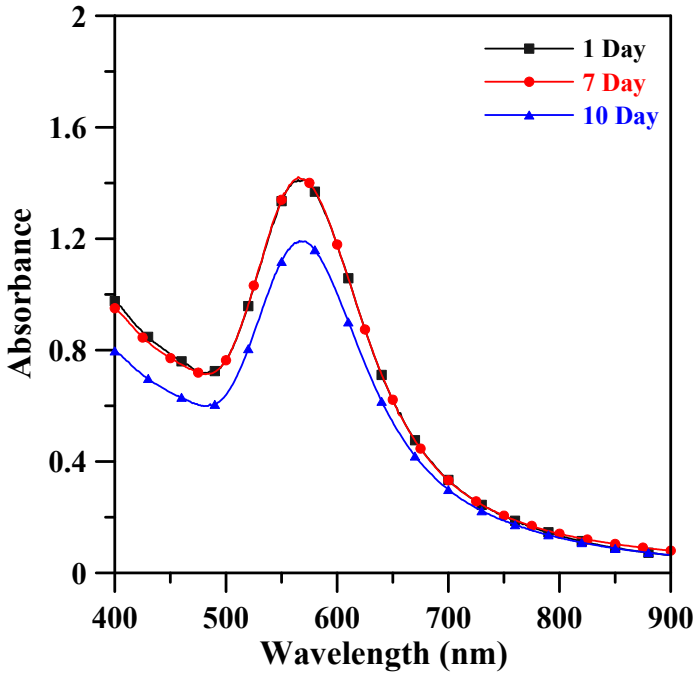

Figure S3. UV-vis absorption spectra of the aqueous suspension of the sample Cat_1Au_1 for one, seven and ten days.

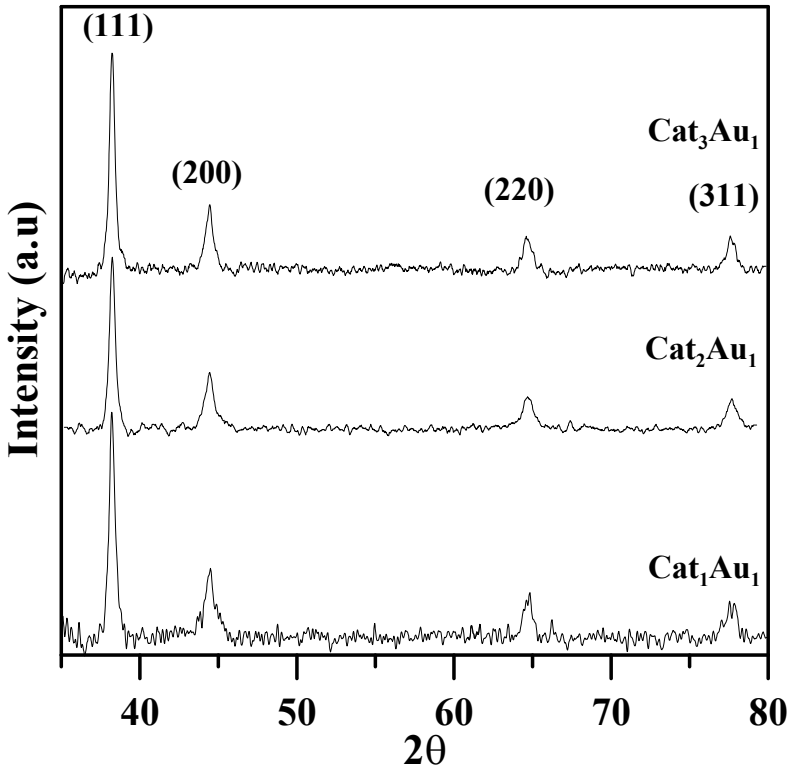

Figure S4. Powder X-ray diffraction patterns of different core-shell samples (see Table 1).

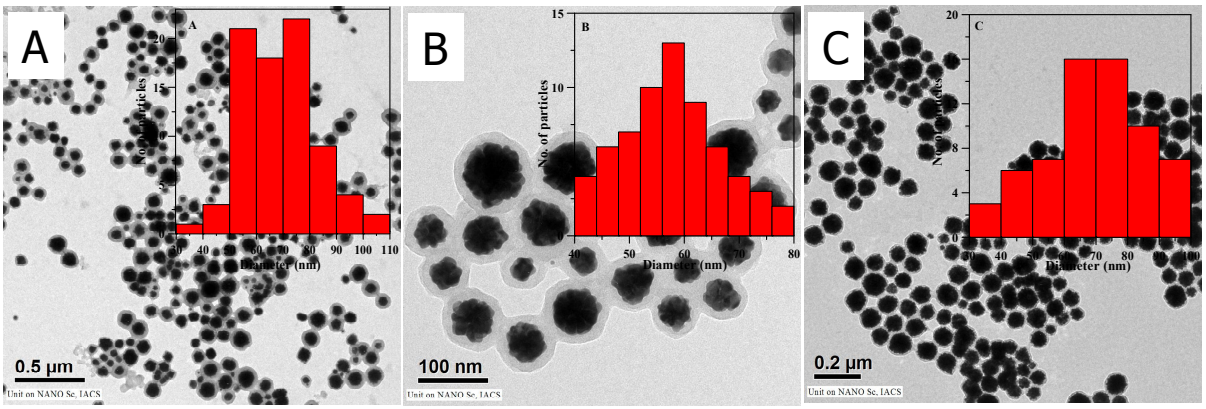

Figure S5: Histogram of particle size distribution of different samples (A) Cat_1Au_1 (B) Cat_2Au_1 and (C) Cat_3Au_1.

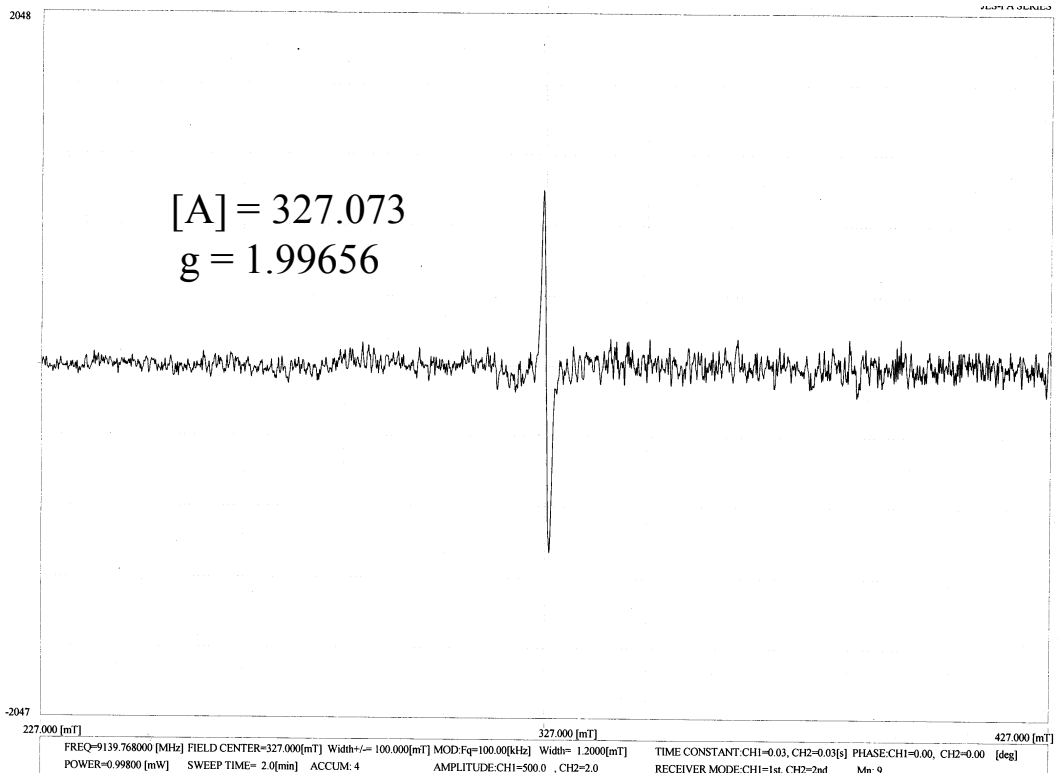

Figure S6. Electron paramagnetic resonance (EPR) spectrum of the sample Cat_1Au_1 at 77 K.

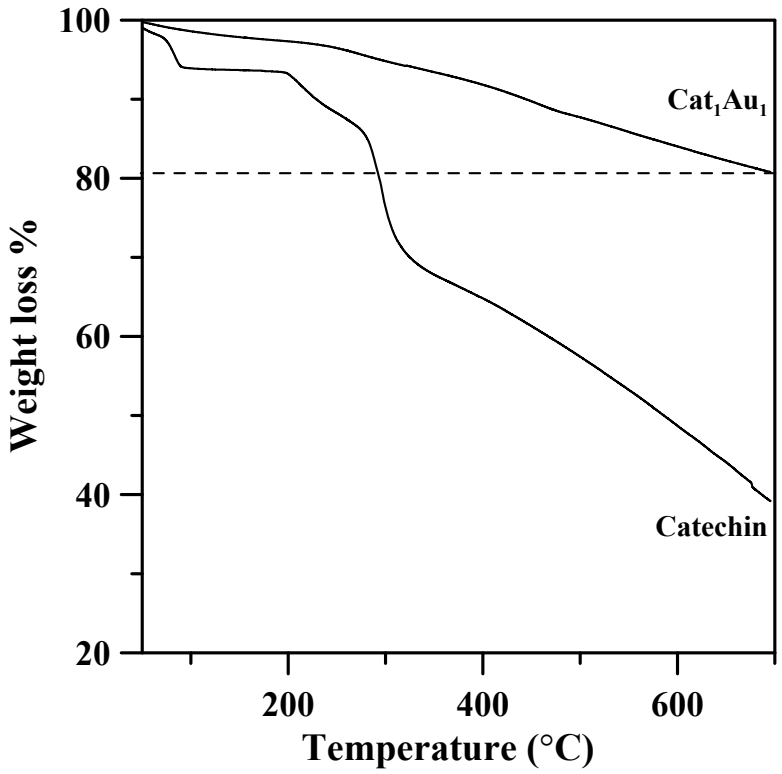

Figure S7. TGA thermograms of the sample Cat_1Au_1 and neat catechin. TGA thermograms reveals about 18 wt % organic materials is present as a shell in the core-shell nanostructures.

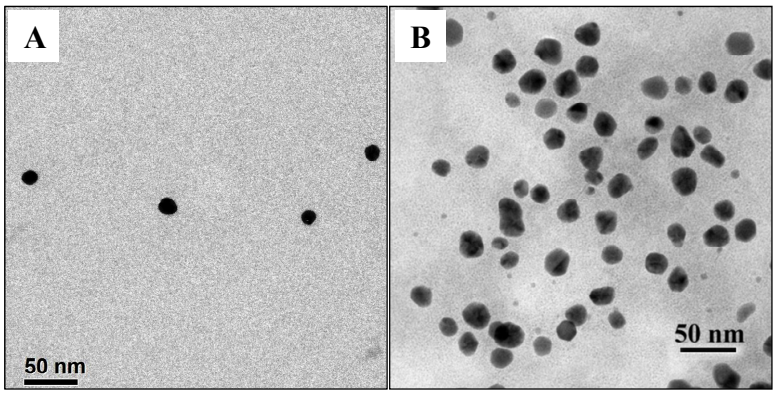

Figure S8. TEM images of (A) GNPs synthesized at pH = 9 and (B) GNPs synthesized in presence of MUA using catechin as a reducing agent.

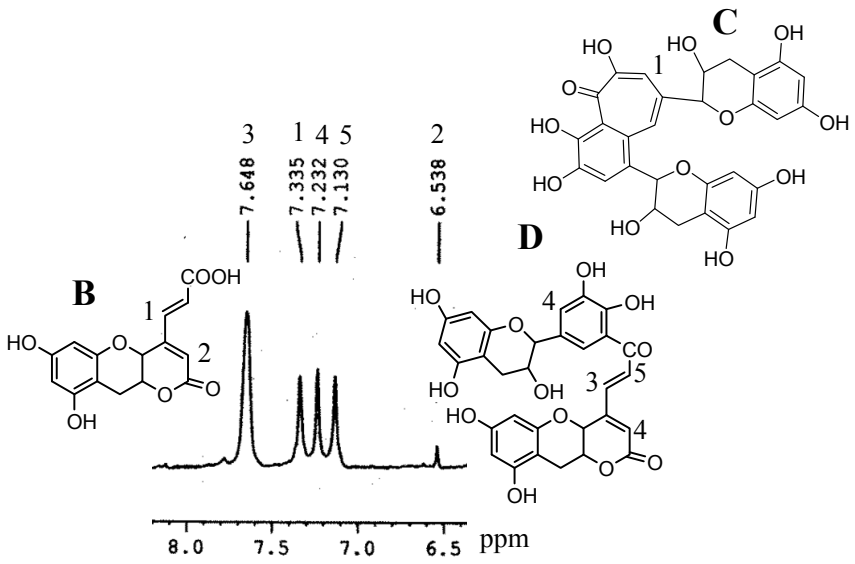

Figure S9. ^{1}H NMR spectrum of the isolated and purified shell materials obtained after KCN treatment followed by the dissolution in d^{6}-DMSO.

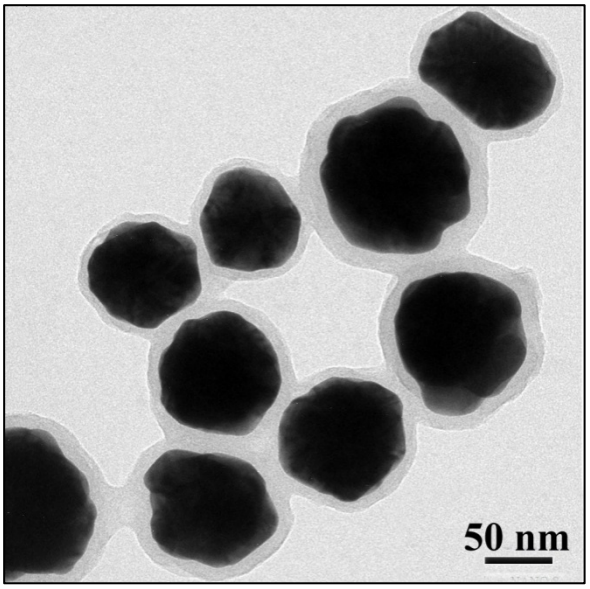

Figure S10. TEM image of the sample Cat_1Au_1 sample after ligand exchange with MUA for 24h.

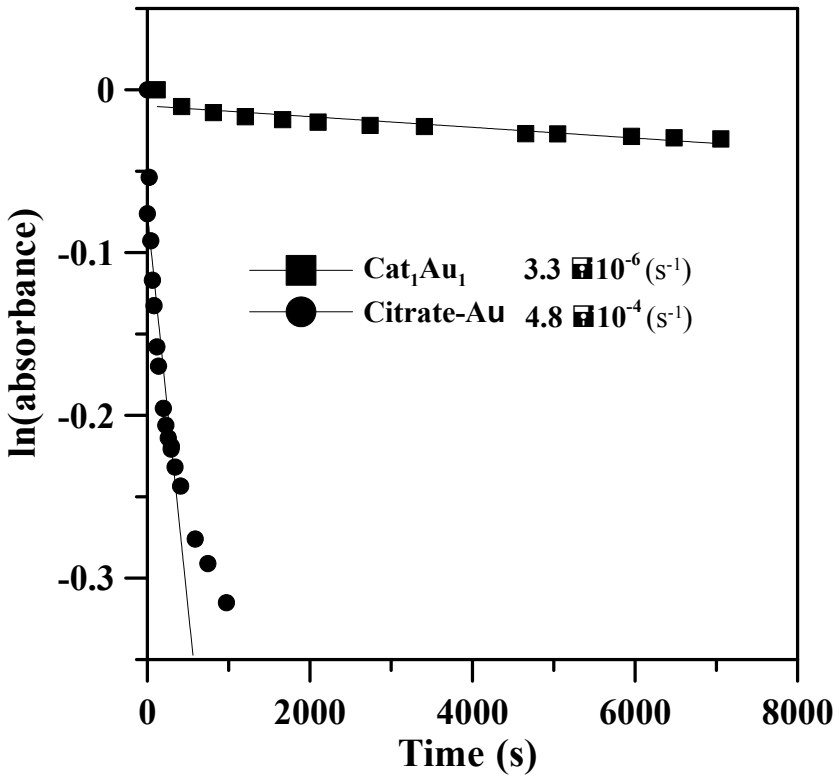

Figure S11. Plot showing dissolution of gold of Cat_1Au_1 core-shell sample and citrate-stabilized Au nanoparticle sample with KCN in water at 25 °C.

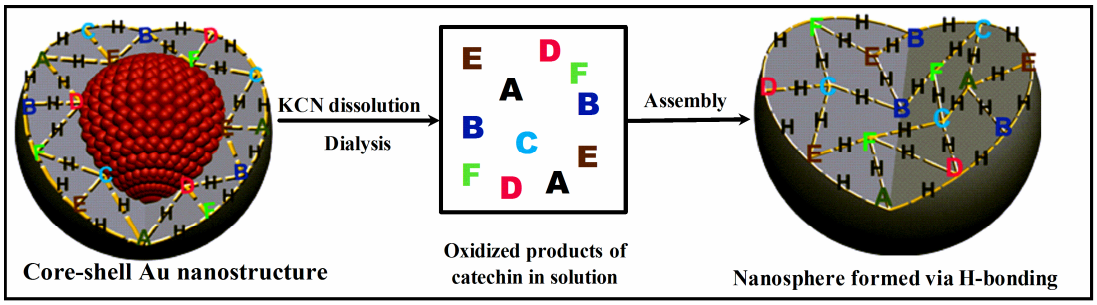

Figure S12. Schematic representation for the dissolution of Au core of the core-shell nanostrucutres and the formation of nanospheres by the assembly of oxidized products of catechin obtained after KCN treatment as shown in Scheme 1.

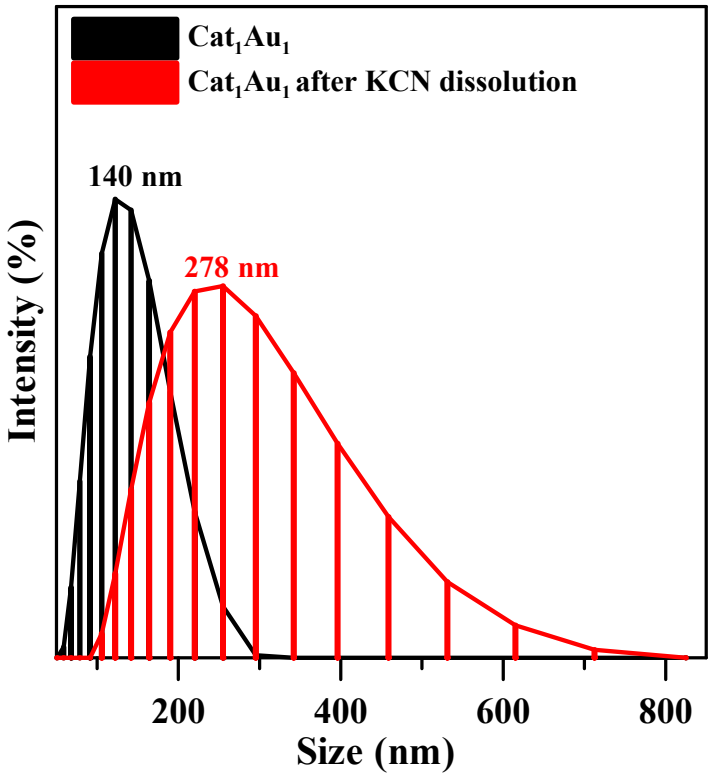

Figure S13. Plot showing log-normal distributions of the sizes of the sample Cat_1Au_1 and the nanospheres obtained from the solution of sample Cat_1Au_1 after with KCN.

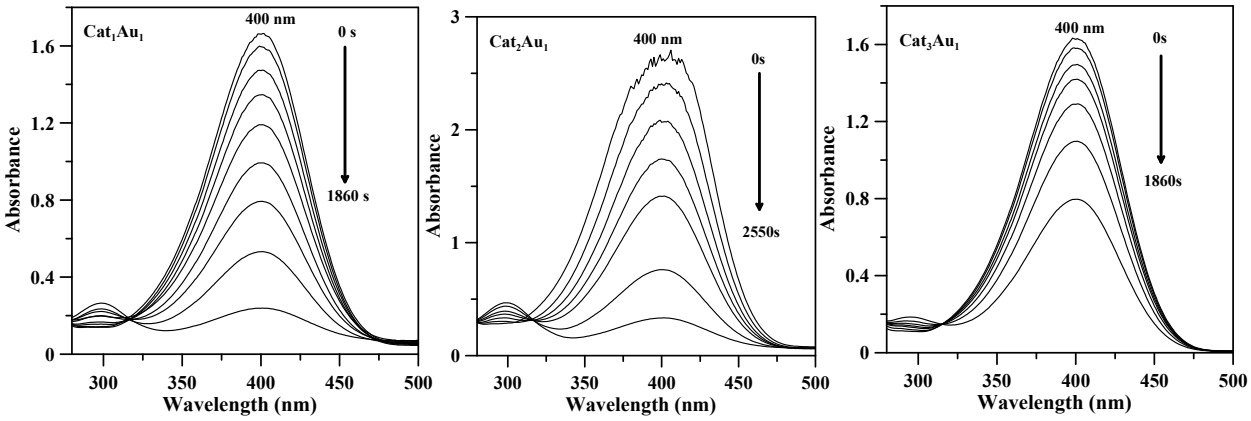

Figure S14. Successive UV-vis absorption spectra with time of the borohydride reduction of *p*-nitrophenol using different core-shell nanostructured smaples.

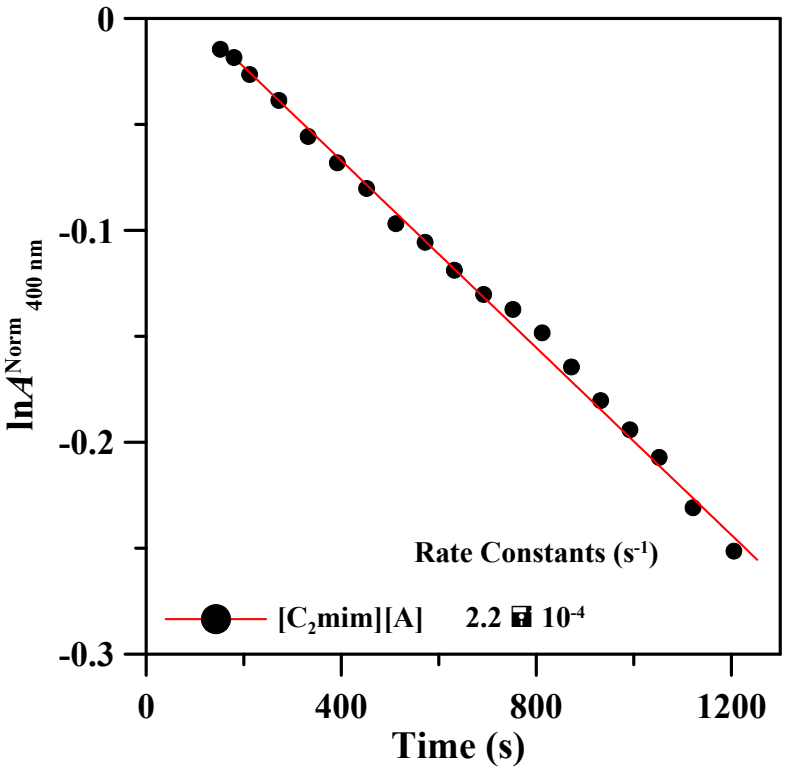

Figure S15. Plot showing ln*A* (A = normalized absorbance at 400nm of *p*-nitrophenolate ion) versus time (s) in the reduction of *p*-nitrophenol catalyzed by [C_2mim][A]-Au raspberry shaped gold nanoparticles without any coating.