

Supporting Information

Synthesis and characterization of multifunctional nanocatalyst based on a novel type of binary-metal-oxide-coated Fe_3O_4 -Au nanoparticle

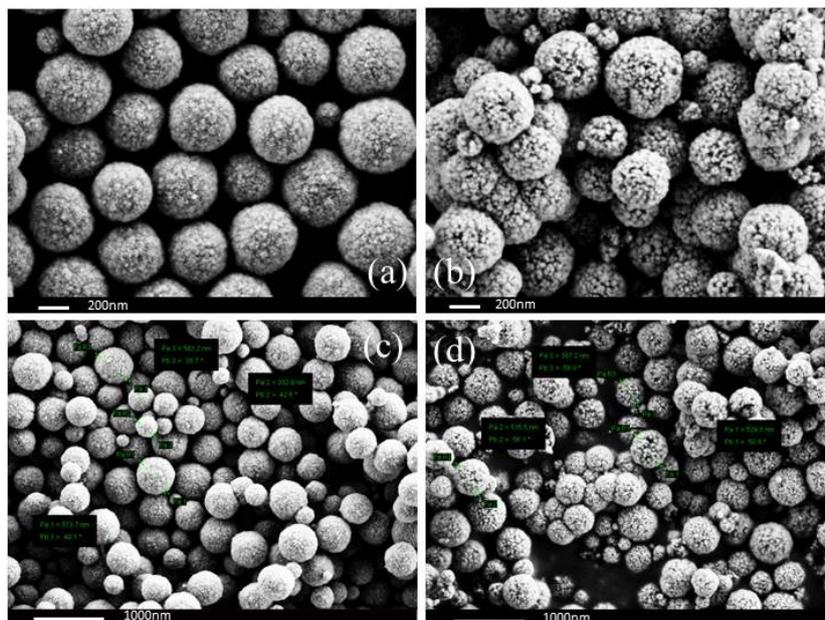
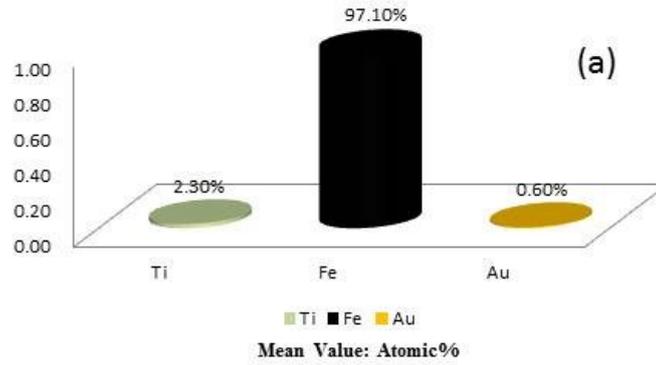
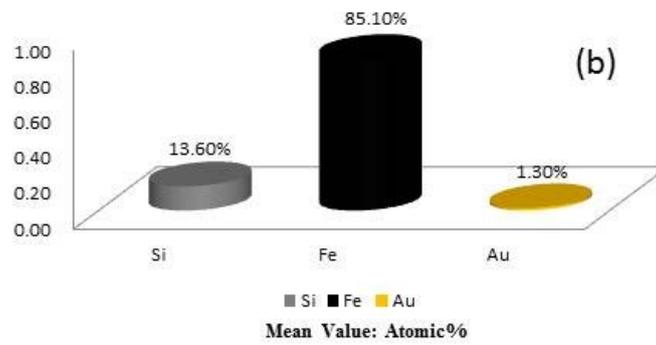


Fig.S1 SEM images of (a, c) Fe_3O_4 , (b, d) $\text{C}/\text{Fe}_3\text{O}_4$.

Pattern of the mean value of atomic% in $\text{TiO}_2/\text{Au}/\text{C}/\text{Fe}_3\text{O}_4$



Pattern of the mean value of atomic% in $\text{SiO}_2/\text{Au}/\text{C}/\text{Fe}_3\text{O}_4$



Pattern of the mean value of atomic% in $\text{mSiO}_2\text{-TiO}_2/\text{Au}/\text{C}/\text{Fe}_3\text{O}_4$

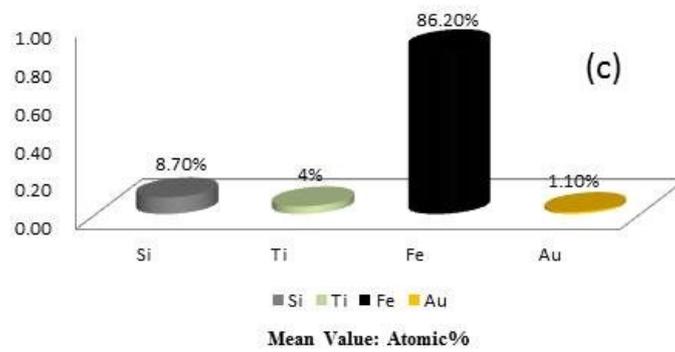


Fig. S2 Patterns of mean value of atomic% in the (a) $\text{TiO}_2/\text{Au}/\text{C}/\text{Fe}_3\text{O}_4$, (b) $\text{mSiO}_2/\text{Au}/\text{C}/\text{Fe}_3\text{O}_4$

and (c) $\text{mSiO}_2\text{-TiO}_2/\text{Au}/\text{C}/\text{Fe}_3\text{O}_4$ magnetic microspheres.

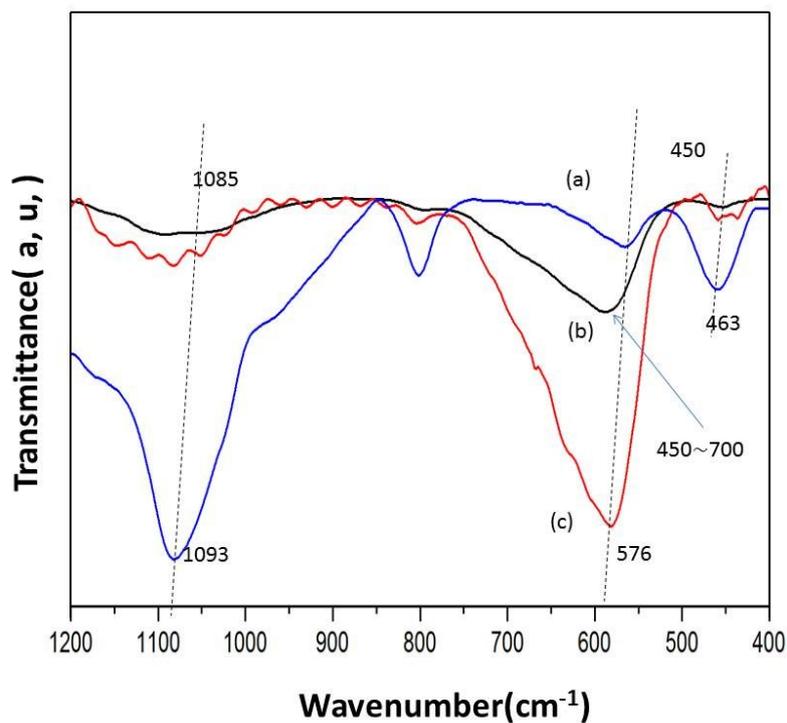


Fig. S3 FT-IR spectra of the as-synthesized (a) mSiO₂/Au/C/Fe₃O₄, (b) mSiO₂-TiO₂/Au/C/Fe₃O₄ and (c) TiO₂/Au/C/Fe₃O₄ magnetic microspheres.

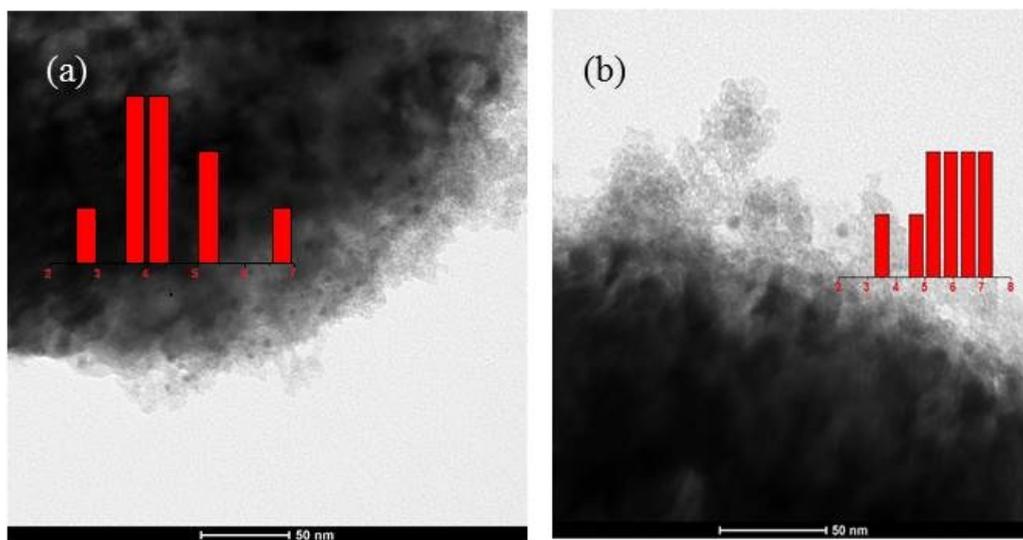


Fig. S4 TEM image of (a) (Si, Ti)-550 catalyst, (b) (Si, Ti)-550 catalyst used five times. The insets are the size distribution histograms of gold nanoparticles.

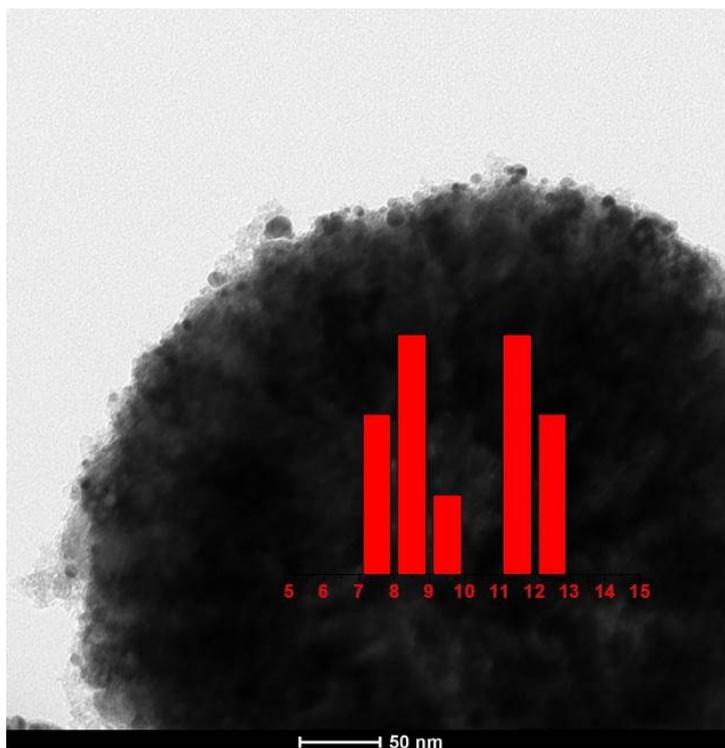


Fig. S5 TEM image of (Si, Ti)-700 catalyst. The insets are the size distribution histograms of gold nanoparticles.

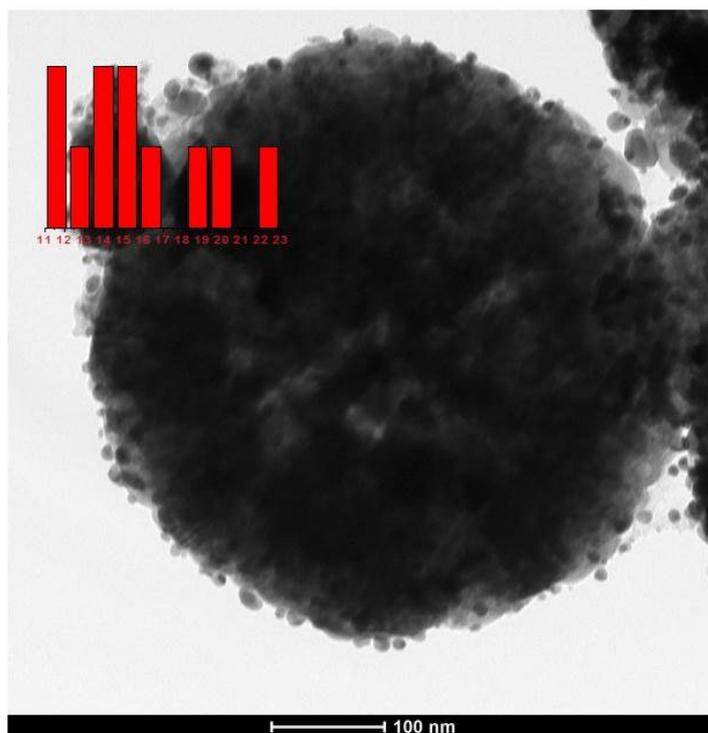


Fig. S6 TEM image of Au/C/Fe₃O₄ calcined at 550 °C. The insets are the size distribution histograms of gold nanoparticles.