Supplementary Information

Synthesis of Catalytically Active Gold Clusters on the Surface of Fe₃O₄@SiO₂ Nanoparticles

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Figure S1. a) TEM image of the Au clusters obtained in water by simply mixing 25 μL of HAuCl₄ 30 mM and 10 mL of TTMAPP porphyrin 0.1 mM at acidic pH. b) Size distribution of the synthesized Au clusters calculated using Image J v1.50i.

Figure S2. TEM micrograph showing Fe₃O₄@SiO₂ nanoparticles obtained in high yield with a homogenous size distribution.
Figure S3. a) Energy Dispersive X-ray Spectroscopy (EDS) confirms the presence of Au onto the surface of the Fe₃O₄@SiO₂ nanoparticles. The quantification of the elements composing the system was 8.45% of Fe, 89.29% of Si, and 2.26% of Au found on the Fe₃O₄@SiO₂@Au nanoparticles analyzed in image b). c) Representation of the size distribution of the Au clusters deposited on SiO₂ nanoparticles.
Figure S4. Control experiments were performed by measuring the absorbance at 400 nm during 10 minutes of the system composed by 200 μL of 4-NP (2 mmol L⁻¹), 1.4 mL of NaBH₄ (100 mmol L⁻¹) and 1.4 mL of H₂O represented by the blue line, and the black line represents the same system after adding 20 μL of the Fe₃O₄@SiO₂ with encapsulated TTMAPP.

Figure S5. From left to right, cuvettes showing the resulting solutions after using different amounts of Fe₃O₄@SiO₂@Au nanoparticles: 0, ◊0.66, △1.00, ○1.65, and □3.30 μg. The intense yellow color indicates the formation of the 4-nitrophenolate ions after NaBH₄ addition.