Supplementary material

Novel highly stable β-Cyclodextrin Fullerene mixed valent Fe-metal framework for quick Fenton degradation of alizarin

Aniruddha Gogoi. Madhukar Navgire, Kanak Chandra Sarma, Parikshit Gogoi

Department of Instrumentation & USIC, Gauhati University, Guwahati 781014, Assam, India
Department of Chemistry, Jijamata College of Science & Arts, Bhende, Ahmadnagar, Maharashtra, India
Department of Chemistry, Nowgong College, Nagaon 782001, Assam, India.
School of Chemical and Biomolecular Engineering, Renewable Bioproducts Institute, Georgia Institute of Technology, Atlanta, Georgia, 30318, United States

*Corresponding Author e-mail: parikk100@gmail.com

Fig.S1. XRD pattern of Fe₃O₄ nanoparticle
Fig. S2: TGA of (a) Fullerene/Fe$_3$O$_4$ (FMNPs) and (b) β-CD-Fullerene/Fe$_3$O$_4$ (CDFMNPs) nanocomposite

Fig. S3: UV-VIS-DRS study of (a) β-CD-Fullerene/Fe$_3$O$_4$ (CDFMNPs) and (b) Fullerene/Fe$_3$O$_4$ (FMNPs) nanocomposite.
Fig. S4: UV-VIS study of (a) β-CD-Fullerene/Fe₃O₄ (CDFMNPs) and (b) Fullerene/ Fe₃O₄ (FMNPs) nanocomposite. (c) plot of $(\alpha h\nu)^2$ vs $h\nu$ for β-CD-Fullerene/ Fe₃O₄ (CDFMNPs) (d) plot of $(\alpha h\nu)^2$ vs $h\nu$ for Fullerene/ Fe₃O₄ (FMNPs)
Fig. S5: EPR study of (a) β-CD-Fullerene/ Fe₃O₄ (CDFMNPs) and (b) Fullerene/ Fe₃O₄ (FMNPs) nanocomposite.

Fig. S6: Pyridine FT-IR study of (a) β-CD-Fullerene/ Fe₃O₄ (CDFMNPs) and (b) Fullerene/ Fe₃O₄ (FMNPs) nanocomposite.
Fig. S7: Effect of H$_2$O$_2$ on rate of alizarin degradation by CDFMNPs, Reaction conditions:
Catalyst = 2.0 g/ L, pH = 3, [Alizarin] = 10 mM at room temperature.

Fig. S8: Effect of pH on rate of alizarin degradation by CDFMNPs, Reaction conditions: [H$_2$O$_2$] = 25 mM, Catalyst = 2.0 g/ L, [Alizarin] = 10 mM at room temperature.
Fig. S9: [ESI (+) ve mode] mass spectra of degraded alizarin by β-CD-Fullerene/ Fe$_3$O$_4$ (CDFMNPs).