RSC Advances

ELECTRONIC SUPPLEMENTARY INFORMATION

Anionic Azo Dyes Removal From Water using Amine-Functionalized Cobalt-Iron Oxide Nanoparticles: A Comparative Time-Dependant Study and Structural Optimization towards Removal Mechanism

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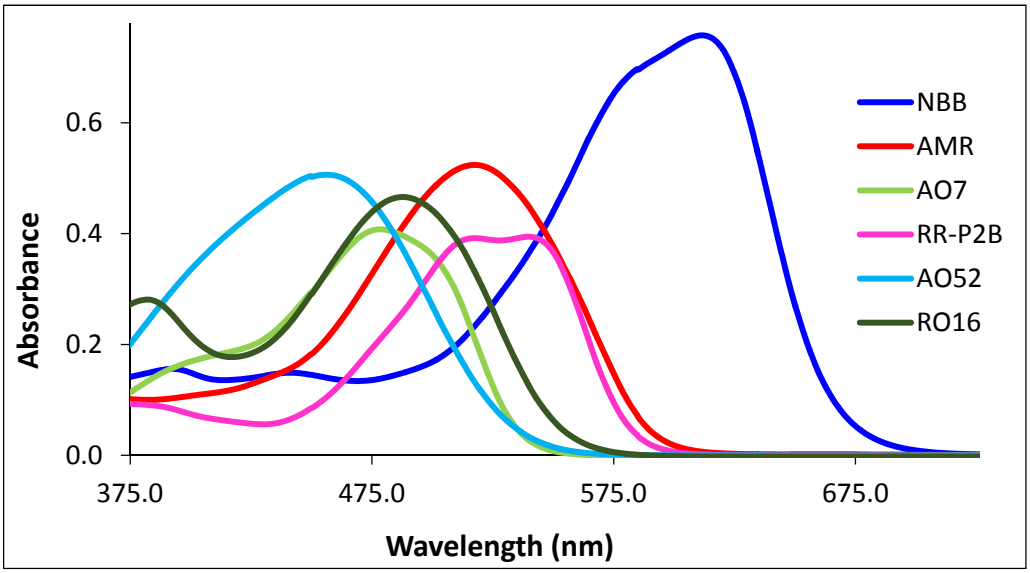


Fig. S1 Overlayed electronic spectra of aqueous NBB, AMR, AO7, RR-P2B, AO52 and RO16 (initial dye concentration = 0.02 mmol L^{-1}, temp. = 30°C, pH = 6).

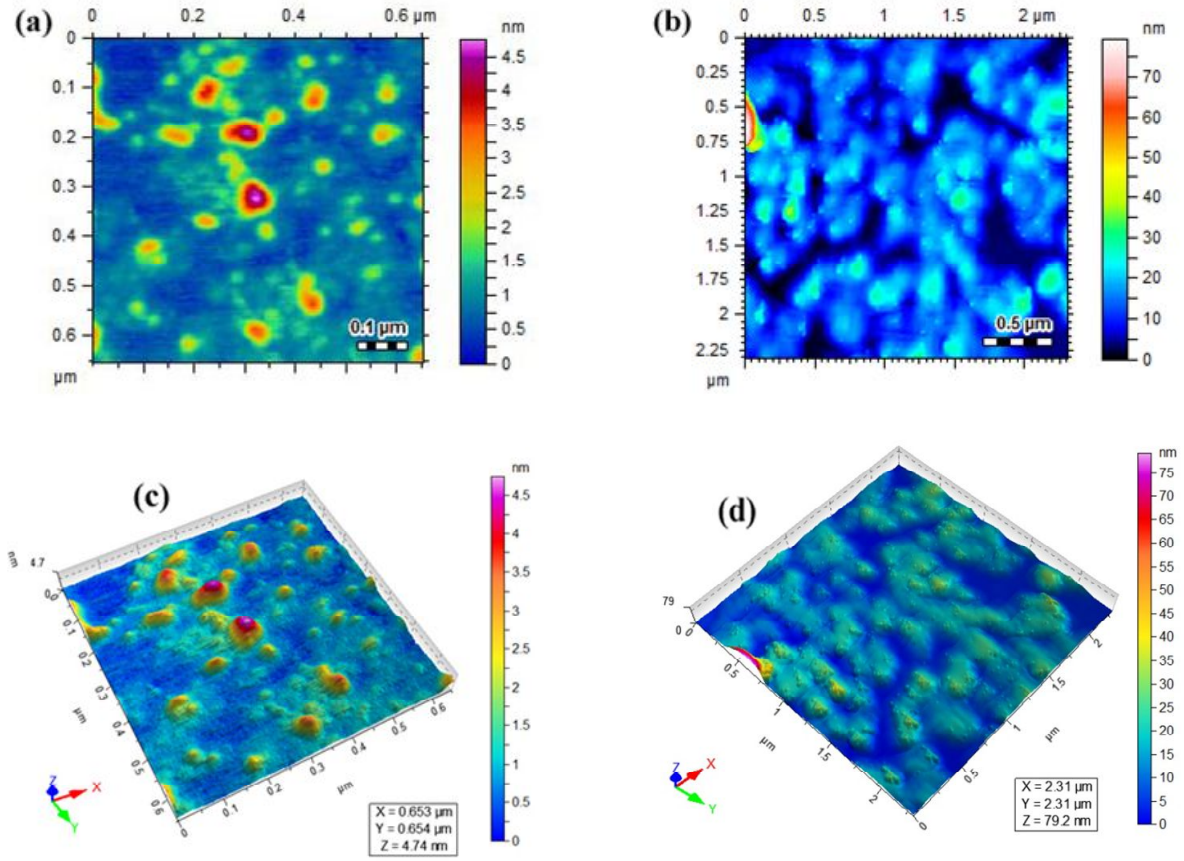


Fig. S2 AFM analysis of amine-functionalized CoFeNPs1 (left) and CoFeNPs2 (right). (a, b) two-dimensional surface images, and (c, d) three-dimensional surface images.

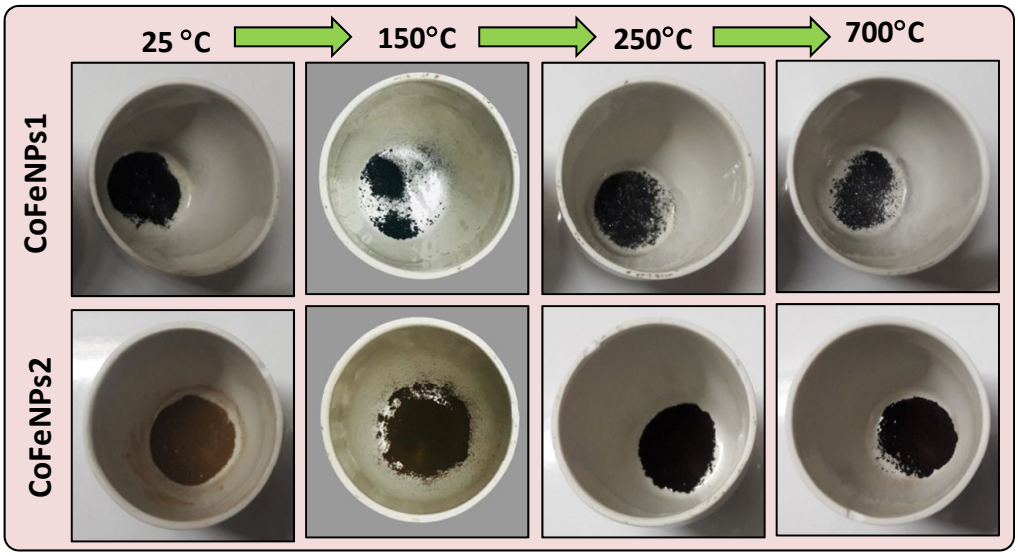


Fig. S3 Color and textural changes observed during aerobic heating of CoFeNPs1 and CoFeNPs2.

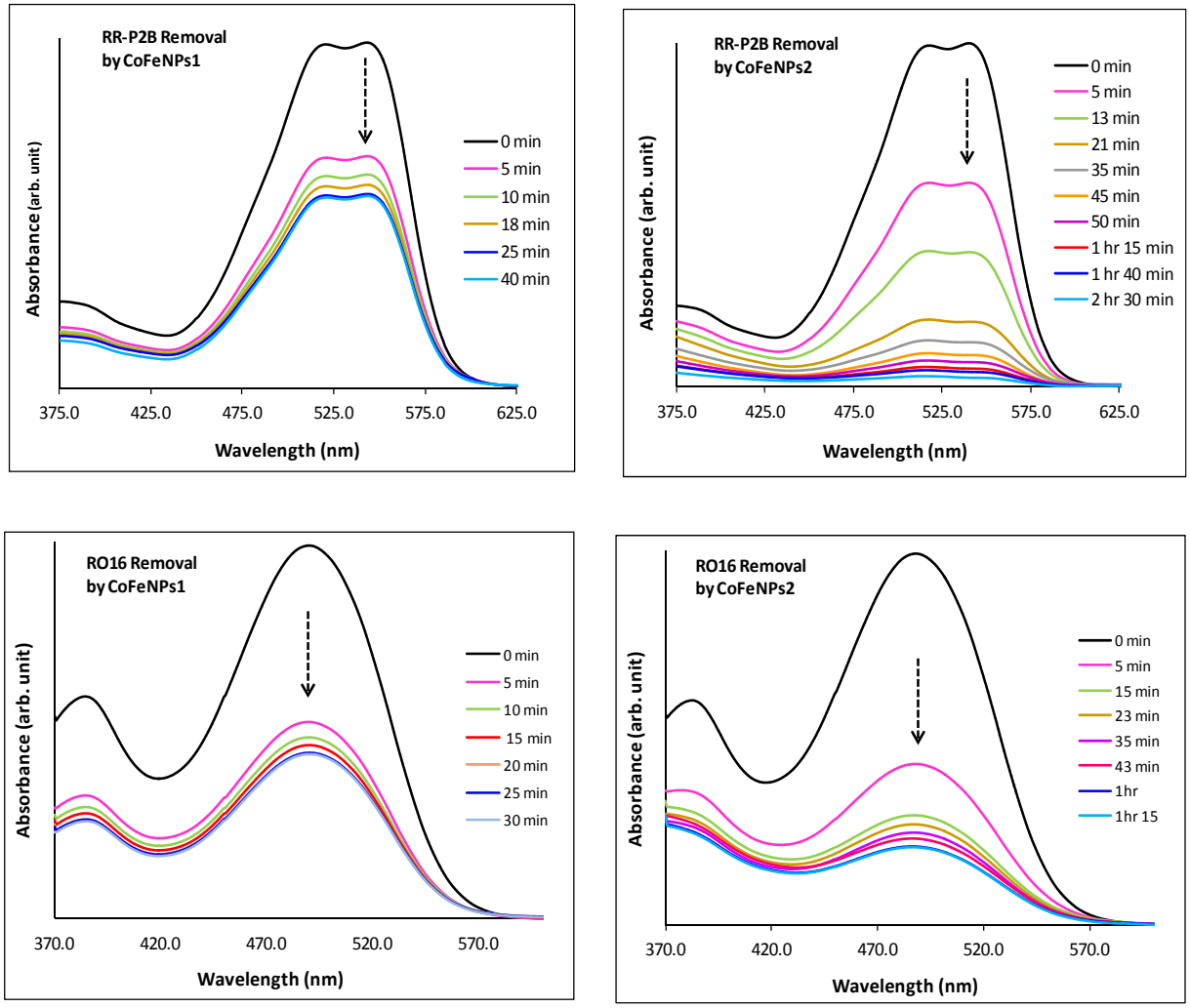


Fig. S4 Comparative electronic spectra of removal of RR-P2B and RO16 at various time intervals by CoFeNPs1 (left) and CoFeNPs2 (right).

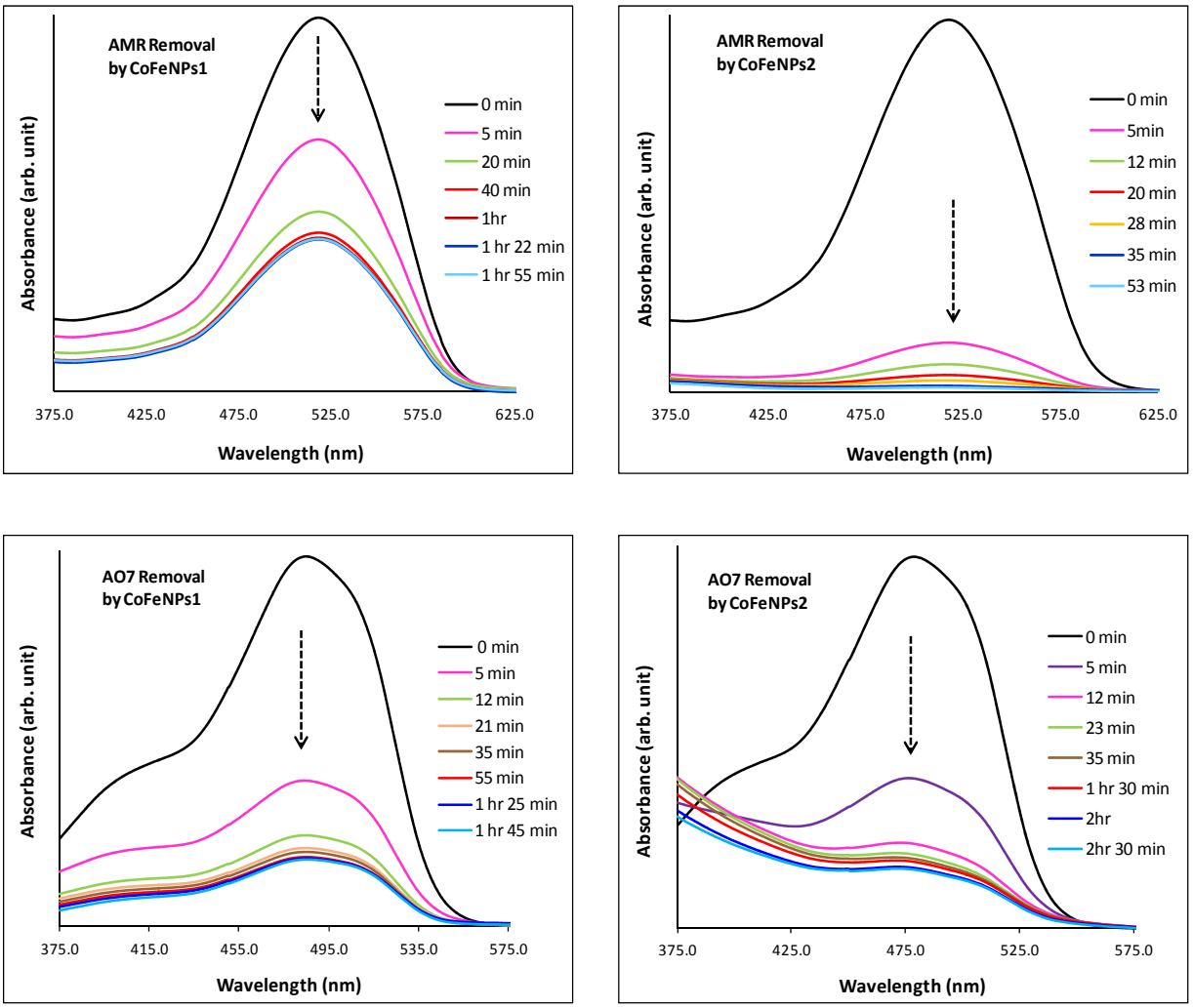


Fig. S5 Comparative electronic spectra of removal of AMR and AO7 at various time intervals by CoFeNPs1 (left) and CoFeNPs2 (right).

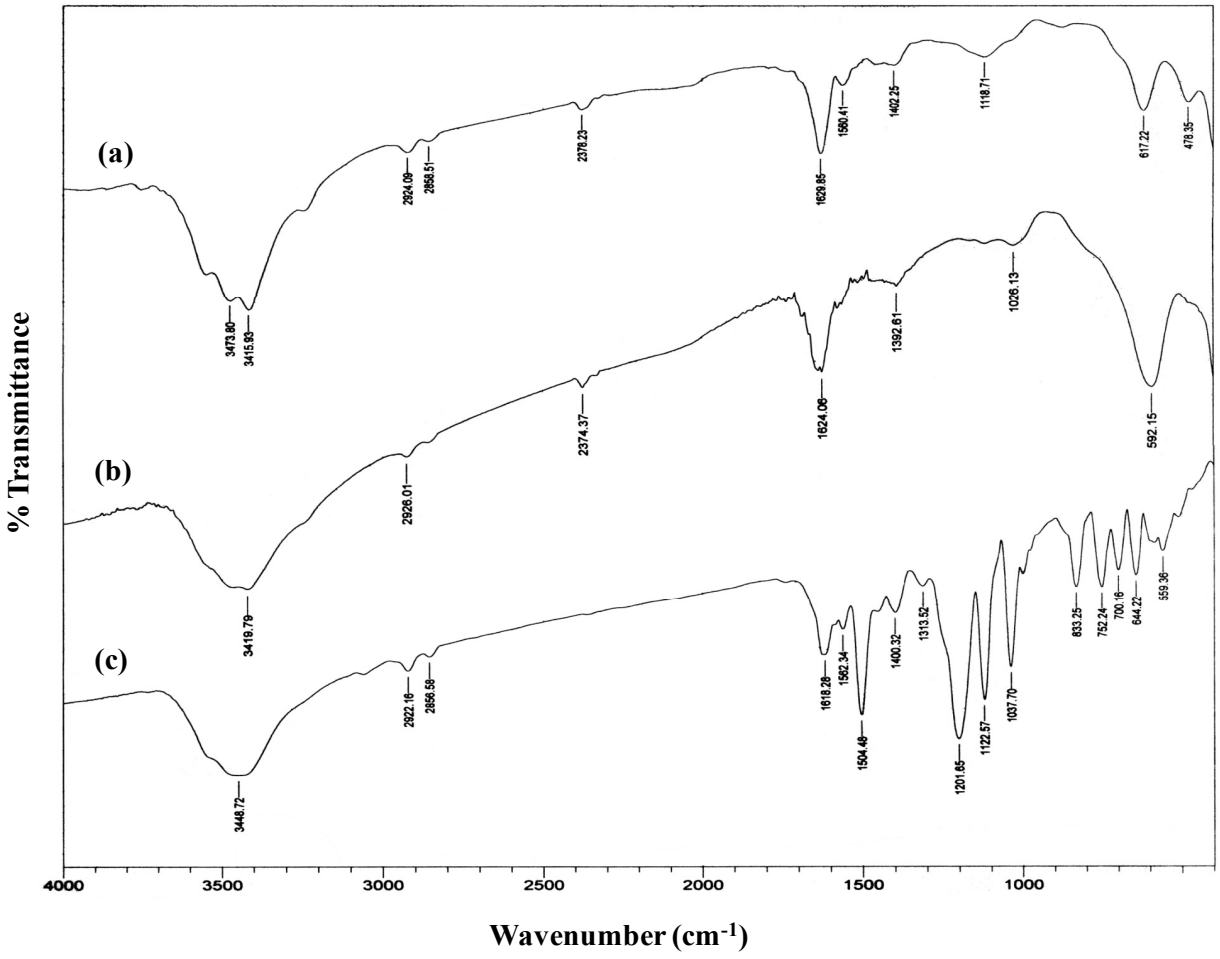
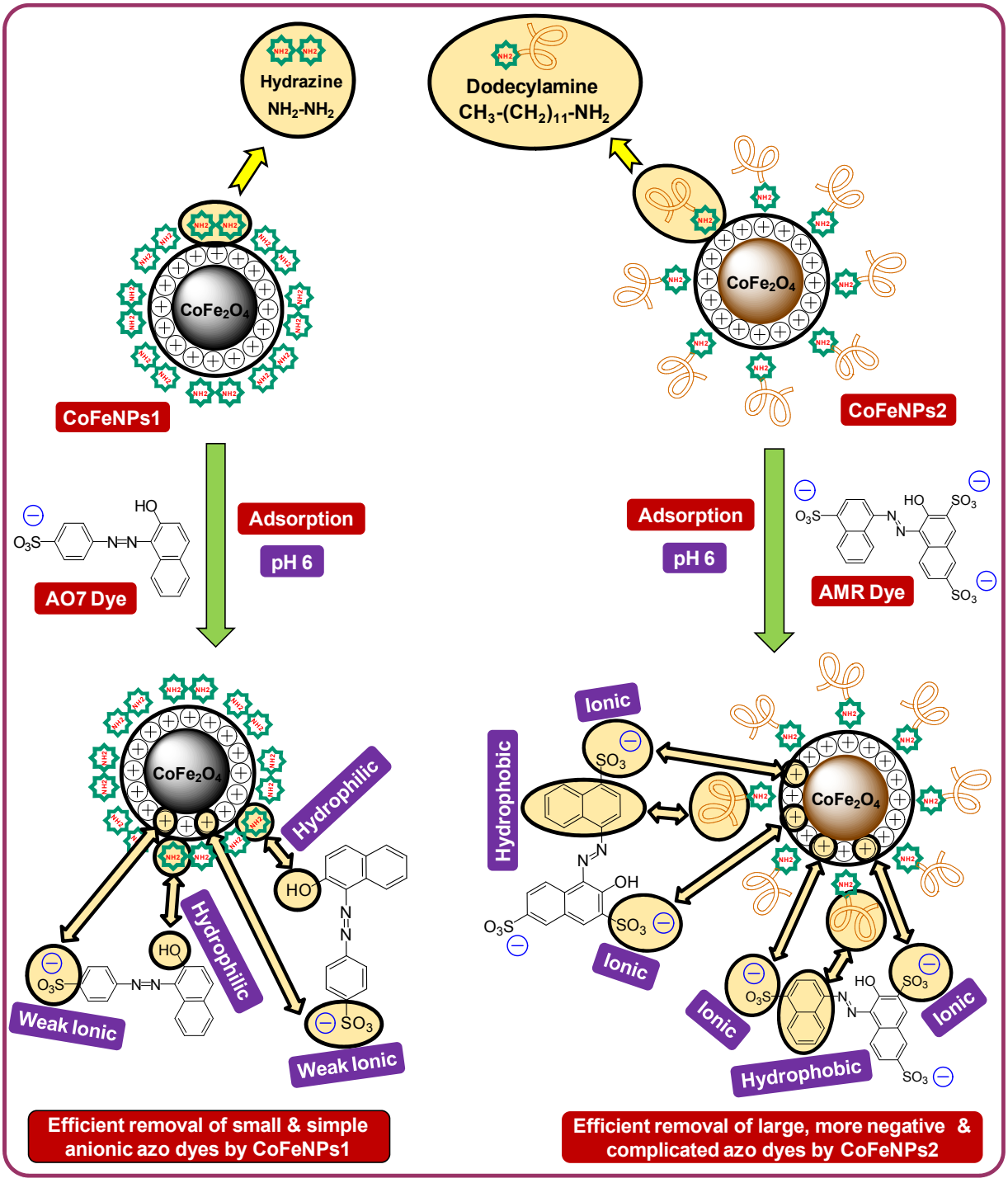


Fig. S6 FT-IR spectrum of (a) AO7-treated CoFeNPs1, (b) AO7-treated CoFeNPs2 and (c) control AO7 dye.



Scheme S1 Probable mechanism of removal of anionic azo dyes by amine-functionalized CoFeNPs (AO7 selected for CoFeNPs1 and AMR selected for CoFeNPs2) showing structural effects and all plausible interactions between NPs and dyes.

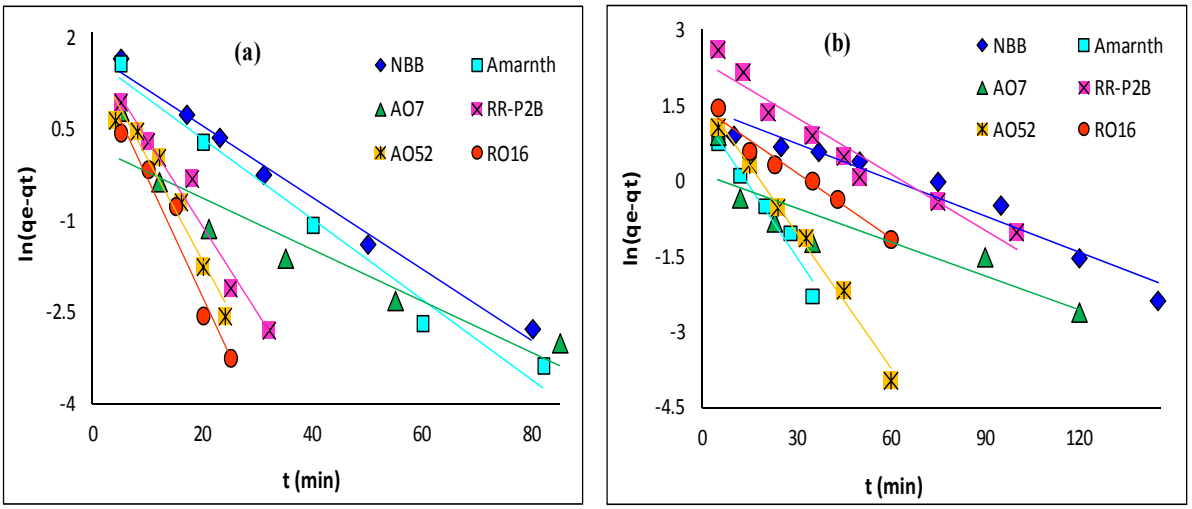


Fig. S7 Pseudo-first order plots of kinetics for the adsorption of anionic azo dyes onto (a) CoFeNPs1 and (b) CoFeNPs2.

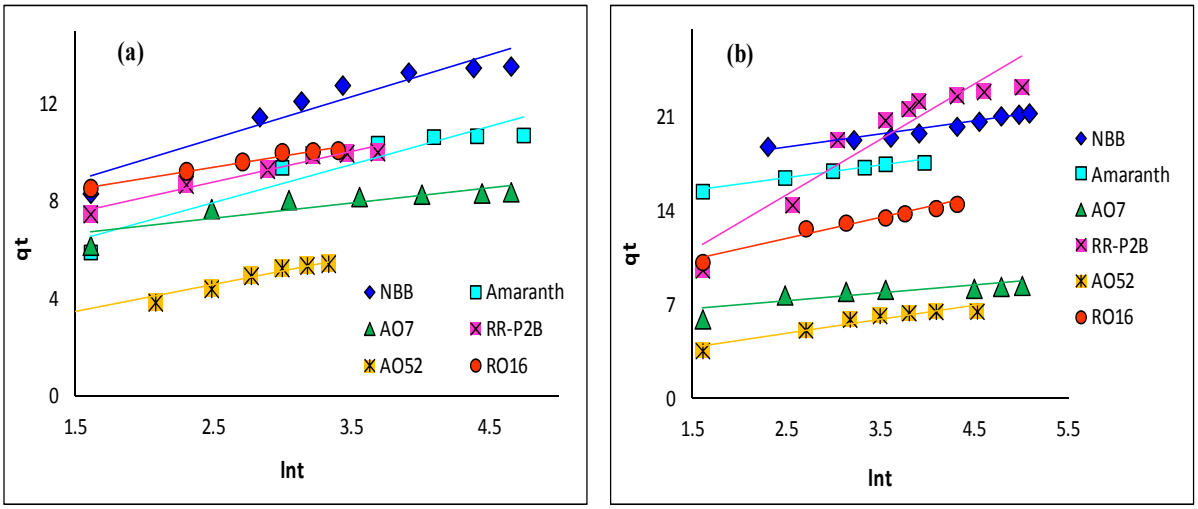


Fig. S8 Elovich plots of kinetics for the adsorption of anionic azo dyes onto (a) CoFeNPs1 and (b) CoFeNPs2.

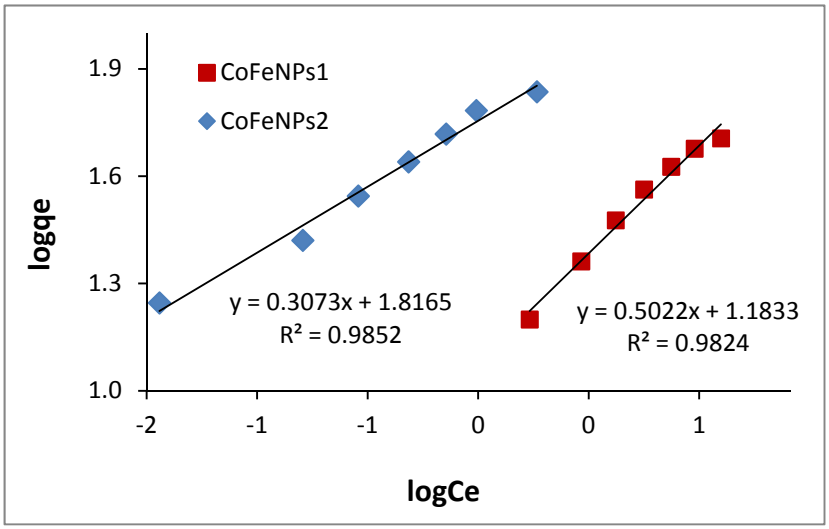


Fig. S9 Freundlich adsorption isotherm for the removal of RO16 by CoFeNPs1 and CoFeNPs2.