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Application of catalytic nanopolymers for the removal of Bisphenol A from aqueous solutions: assessed by three statistical modeling strategies

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ABSTRACT

This study reports a new strategy for stabilizing palladized iron (Fe-Pd) nanoparticles with sodium carboxymethyl cellulose (CMC) as a stabilizer for the removal of Bisphenol A (BPA) from aqueous solutions. Transmission electron microscopy (TEM) analyses indicated that the CMC-stabilized nanoparticle with a diameter 20 nm is highly dispersed in water. At an optimum dosage of 0.17 g/l, the Fe-Pd bimetallic nanoparticle was able to remove 94% of BPA (C_0 = 0.75 mg/l) in 70 min, suggesting that presence of Pd could significantly enhance removal of BPA. It was found that the optimum pH, contact time, and BPA concentration for efficient removal of BPA concentrations from aqueous solutions were 7, 70 min, and 0.75 mg/l, respectively. It was concluded that Fe-Pd bimetallic nanoparticle is an efficient adsorbent for BPA removal from aqueous solutions.

Keywords: Bisphenol A (BPA); Catalytic reduction; Carboxymethylcellulose sodium (CMC); Endocrine disrupting chemicals (EDCs); Nanopolymer; Stabilizer

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