

عنوان مقاله:

Synthesis of Bare and Four Different Polymer- Stabilized Zero-Valent Iron Nanoparticles and Their Efficiency on Hexavalent Chromium Removal from Aqueous Solutions

محل انتشار:

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خلاصه مقاله:

Zero-valent iron particles at the nanoscale are proposed to be one of the important reductants of Cr(VI), transforming the same into nontoxic Cr(III). In this study zero valent iron nanoparticles(ZVINS) were synthesized and characterized for hexavalent chromium removal from aqueous solutions. Five different zero-valent iron nanoparticle types comprising of bare and stabilized ZVINS with poly acrylamide(PAM), polyvinyl pyrrolidone(PVP), polystyrene sulfonate(PSS) and guar gum(GG) were synthesized and employed in this study. The sizes of zero-valent iron nanoparticles were found to be 40, 14, 17, 29 and 34nm, using transmission electron microscopy (TEM), corresponding to bare zero valent iron nanoparticles(ZVINS), poly acrylamide(PAM), guar gum(G G), poly styrene sulfonate(PSS) and polyvinyl pyrrolidone(PVP) stabilized zero valent iron nanoparticles (ZVINS) respectively. The trend in the sizes of ZVINS with various stabilizers in the decreasing order was found to be bare ZVIN > PVP-ZVIN > PSS-ZVIN> GG-ZVIN> PAM-ZVIN respectively. Results showed that by increasing hexavalent chromium concentrations from 20 to 100 mg/L, the Cr(VI) efficiency removal decreased significantly. When the ZVINS concentrations increased from 2 to 10 gr/L(0.1 to 0.5g per 50 mL), the Cr(VI) removal efficiency enhanced. The most effective treatments of ZVINS and Cr(VI) for hexavalent chromium removal from solutions were 10 gr/lit (0.5g per 50 mL) and 20 mg/L respectively, so the efficiency of bare and polymer stabilized-ZVINS on Cr(VI) removal from solutions was found to be in the following order: bare ZVINS < PVP-ZVINS

کلمات کلیدی:

Chromium; Polymer; Removal; Stabilize; Zero-Valent Iron Nanoparticles

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