عنوان مقاله:

Removal of Ortho- chlorophenol from Aqueous Solutions Using Zero-Valent Iron Nanoparticles Modified Clay (Case (Clay Soils of ShahMorad Mountains in Rafsanjan

محل انتشار:

فصلنامه بهداشت، ایمنی و محیط زیست, دوره 5, شماره 4 (سال: 1397)

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خلاصه مقاله:

Chlorophenols as priority pollutants are toxic. These acidic organic compounds cause digestive disorders, liver damage, and cancers. The aim of this study is Ortho- chlorophenol removal using zero-valent iron nanoparticles modified clay. In this experimental study, the clay soil was sampled from the mountains of Shah Murad, Rafsanjan, Iran. Then it was treated with hydrochloric acid. In the next step, the clay was modified with ferrous sulfate in the presence of the N2 gas to prepare magnetic clay. Then, the prepared adsorbent was used to remove o-chlorophenol as a function of pH, adsorbent dose and contact time. In addition, adsorption isotherms and kinetics were determined. The findings of the present study showed that the removal efficiency obtained by the iron nanoparticles carrying clay was higher than that of the raw clay. The highest removal efficiency (91.3 %.) was obtained for pH 4. The o-CP removal efficiency by the modified clay increased from 35.9 to 82.7 as the adsorbent dosage is increased from 0.05 to 1 g after 120min contact time. The Langmuir isotherm model and the second-order kinetic model provided the best fit to the experimental data compared to other studied models. The results showed that the modified adsorbent could be used an effective and readily available low-cost adsorbent for the removal of chlorophenols in industrial applications.

کلمات کلیدی:

Chlorophenols, Adsorption, Clay, Iron nanoparticle