عنوان مقاله:

Adsorption of cadmium and nickel from aqueous environments using a dendrimer

محل انتشار:

مجله پیشرفت در تحقیقات بهداشت محیط, دوره 8, شماره 1 (سال: 1399)

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خلاصه مقاله:

Numerous heavy metals such ascadmium and nickel are toxic present in industrial wastewater and could cause severe damage to living organisms. These compounds are considered to be common contaminants, which are discharged into water resources and cause major environmental problems. Due to the excessive toxicity of heavy metals even at low concentrations, they also threaten human health. Therefore, it is essential to remove these elements from wastewater before discharge into the environment. The present study aimed to evaluate the adsorption of cadmium and nickel from aqueous solutions using poly (propyleneimine) (PPI) dendrimer, as well as the influential factors such as pH, PPI dosage, and the initial concentration of cadmium and nickel using a batch model. To assess the mechanism of adsorption and calculate the maximum adsorption values, the Langmuir and Freundlich isotherms were used. The findings indicated that increased pH and adsorbent dosage improved the removal efficiency. In contrast, increased heavy metal ion concentrations decreased the adsorption. According to the dynamic light scattering analysis, the mean diameter of the PPI dendrimer was 1-10 nm, and the maximum adsorption of both heavy metal ions occurred at the pH of seven. In addition, the maximum uptake of cadmium and nickel was attained with the adsorbent dosage of 0.08 g/l. The maximum removal capacities of the PPI dendrimer for nickel and cadmium .were estimated at 1,428 and 1,225 mg/g, respectively

کلمات کلیدی:

Adsorption, Cadmium, nickel, Dendrimer