

Chemically modified styrene butadiene styrene, characterization and adsorbent application for metal ions removal from aqueous solution

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Received 14 August 2019; Accepted 12 February 2020

ABSTRACT

In this study, the styrene-butadiene-styrene was modified with various processes like nitration, reduction and then cross-linked with cross-linking agents glutaraldehyde. The Fourier transform infrared spectrometer (FT-IR) study showed that the styrene-butadiene-styrene was chemically modified by various processes like nitration, reduction and then cross-linked by crossing linking agent glutaraldehyde. The morphological study showed that the surface of chemically modified styrene-butadiene-styrene (CM-SBS) is more heterogeneous and porous as compared to pure styrene-butadiene-styrene (SBS). The adsorbents were also characterized by energy dispersive X-rays (EDX) and pH_{zpc} . The CM-SBS and styrene butadiene styrene (SBS) was used as an adsorbent for the removal of Cu(II) and Pb(II) ions from aqueous solution. It was found that the CM-SBS adsorbed 0.18 and 0.06 mmol g^{-1} while pure SBS adsorbed 0.1 and 0.03 mmol g^{-1} of Cu(II) and Pb(II) ions, respectively. The kinetic study showed that the adsorption study followed pseudo-second-order kinetics, which indicated that the chemical sorption is the rate-limiting step. The obtained adsorption data were also fitted to Langmuir, Freundlich and Temkin isotherms, which followed the entire models. It was also found that the Freundlich model presents the best result than Langmuir and Temkin isotherms.

Keywords: Styrene butadiene styrene; Adsorption; Morphology; Adsorption isotherms; Adsorption kinetics

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