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STUDIES ON GLUTARALDEHYDE CROSSLINKED XANTHATED CHITOSAN TOWARDS THE REMOVAL OF MERCURY (II) FROM CONTAMINATED WATER STREAMS

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Abstract

Chitosan was cross linked with glutaraldehyde and chemically modified by introducing xanthate group onto its backbone using carbon disulfide under alkaline conditions. This crosslinked xanthated chitosan flakes (XC) was used as an adsorbent for the removal of mercury ions from contaminated water streams near the coal mines. XC was found to be far more efficient than the conventionally used adsorbent activated carbon. FTIR studies indicated the interaction both amine and the xanthate groups. The maximum uptake of mercury by XC in batch studies was found to be 425.5 ± 2.5 mg/g at an optimum pH of 4.0. Due to the high formation constant of mercury with xanthate and adsorption was carried out at pH 4, anions like nitrate, chloride and sulfate up to 0.5M did not interfere in the adsorption behavior of mercury. Thermodynamic parameters such as ΔS , ΔH and ΔG indicated the suitability of XC towards the removal of mercury. Desorption of the bound mercury from XC was accomplished with 0.01 M NaOH. The data from regeneration efficiencies for five cycles, evidenced the reusability of XC in the treatment of mercury-laden wastewater.

Key words: adsorption, chitosan, heavy metal, mercury, xanthation

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