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Original Research Article

Removal of Toxic Cr(VI) Ions from Water Sample a Novel Magnetic Graphene Oxide Nanocomposite

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ABSTRACT

This work describes the synthesis of a novel magnetic graphene oxide composite for removal of Cr(VI) ions. The synthesized nanosorbent were characterized with various techniques such as FT-IR, X-ray diffraction (XRD), scanning electron microscopy (SEM), elemental analysis and vibrating sample magnetometry (VSM). This material is illustrated to represent a viable sorbent for the removal of Cr(VI) ions. A Box-Behnken design was applied to optimize the parameters affecting the removal of Cr(VI). Three variables including sorption time, amount of the magnetic sorbent and sample pH were optimized in the removal process. Besides, the recovery of the sorbent was studied. Equilibrium isotherms were studied, and three models were applied to analyze the equilibrium adsorption data. The results revealed that the adsorption process obeyed the Langmuir model. Kinetic studies indicated the adsorption process followed a pseudo-second-order model. *Maximum* sorption capacity of the sorbent for Cr(VI) ions was 250 mg g⁻¹.

Keywords: Magnetic graphene oxide composite, Cr(VI) ions, Adsorption isotherm, Kinetic studies, Removal.