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COMPARATIVE STUDIES REGARDING MOLYBDATE ADSORPTION ONTO Mg_nFe LAYERED DOUBLE HYDROXIDES OBTAINED FROM REAGENT AND WASTE SLUDGE

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Abstract

Molybdate anions are used in a lot of fields and represent an essential trace element for plant and animal life; however, excessive amounts can cause adverse effect on various organism and environment. Therefore, in the present paper the adsorption performance of Mg_nFe - layered double hydroxides in the removal process of molybdate from aqueous solutions was studied. The layered double hydroxide (LDH) was synthesized by co-precipitation at low oversaturation method. Different ratio between Mg and Fe ions was used (Mg:Fe = 2:1; 3:1 and 4:1). The studied Mg_nFe - layered double hydroxides were synthesized starting from reagent and from iron waste sludge resulted from hot-dip galvanizing industry. In the removal process of molybdate from aqueous solutions were used the as-obtained and calcined at 450 °C adsorbents. The structural and morphological characterization of the obtained samples were made using BET (Brunauer-Emmett-Teller) analysis method, X-ray diffraction (XRD) and Scanning electron microscopy (SEM). The LDH materials obtained from an industrial waste have structural characteristics and similar or even higher adsorptive performance, as compared to those obtained from analytical grade reagents. Therefore, the approached LDH synthesis method, starting from secondary resources, represents a viable, affordable, and green route. This can successfully replace the expensive and resource-intensive traditional synthesis method, leading to cost reduction and valuable benefits in terms of environmental protection.

Key words: adsorption, layered double hydroxide, molybdate

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