

Valorization of activated saline slags as adsorbents for the removal of acid dyes from aqueous solutions

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Abstract

This work describes the surface properties of activated saline slags generated during aluminium recycling processes and the application of these materials as adsorbents for the removal of Orange II and Acid Blue 80 from aqueous solutions. Saline slags were chemically treated with 2 mol/dm³ aqueous solutions of HCl, H₂SO₄ and NaOH for 2 h using a reflux system. The solids were characterized by nitrogen adsorption at -196°C, X-ray diffraction and ammonia pulse chemisorption at 70°C. The chemical treatment reduces the textural properties of the saline slag (see Figure 1-A) and increases the adsorption capacity of ammonia in the case of acid activated solids. Considering the adsorption capacity of these materials, it is observed that the saline slag treated with HCl adsorb rapidly and all the amount of dyes present in solution. The other materials can retain between 50 and 70% of the molecules present in solution. The kinetic (see Figure 1-B) and equilibrium results have been fitted using several mathematical models. The results showed that activated saline slags can be used as adsorbents in wastewater treatment for the removal of organic contaminants.

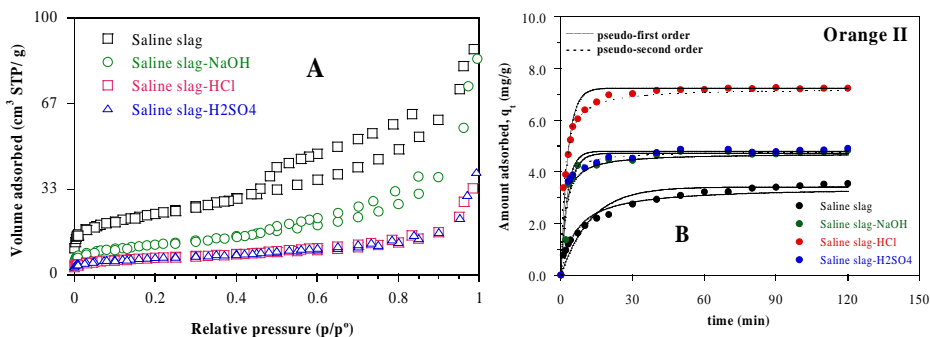


Figure 1: A-Nitrogen adsorption at -196°C. B-Experimental (symbols) and model (lines) for the kinetic adsorption of Orange II on the activated saline slags.

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