

Investigations of nickel (II) removal from aqueous effluents using electric arc furnace slag

Abstract

The tendency of electric arc furnace (EAF) slag to adsorb nickel(II) from aqueous solution has been investigated through batch experiments. Scanning electron microscopy (SEM), Fourier Transform Infrared Spectroscopy (FTIR) and Energy Dispersive X-Ray (EDX) Analysis. Analysis was characterized in order to give insight into the properties of electric arc furnace slag (EAFS). The adsorption result revealed that the maximum uptake by the EAFS was 160.92mg/g at an equilibrium time of 216hr. The pseudo-second order kinetic fitted well with the kinetic data, showing a high determination coefficient (R^2) of over 0.996. The adsorption isotherms of nickel(II) on this adsorbent for both linear and non linear isotherms were well described by Langmuir model, this is because it showed a good fitting to the experimental data when compared to other isotherm models. Moreover the nickel(II) adsorption was found to be dependent on the adsorbent dosage, contact time and initial metal ion concentration. From the result it can be deduced that EAFS could be used to effectively adsorb nickel(II) from aqueous solution.

Keyword: Electric arc furnace slag; Adsorption isotherm; Sorption kinetics; Nickel