# Removal of Ni (II) from aqueous solution by an electric arc furnace slag using artificial neural network approach

## Abstract

An artificial neural network (ANN) was built to model the adsorption of nickel on electric arc furnace slag (EAFS). The effect of operating parameters such as pH, the initial metal ion concentration, particle size, and adsorbent dosage were investigated to optimize the sorption process. The operating variables were used as the input for a neural network, which predicted the nickel (II) ion uptake at any time point as the output. The adsorbent was characterized by SEM and BET measurements. From the experimental results the adsorption capacity of 45% was obtained at pH of 8, also as when the adsorbent dosage increases from 0.1 to 1 g/l there is an increase in the percentage removal of Ni(II) ion from 25% to 37% respectively. Further more from the particle size analysis result, it revealed that as the particle size increases from 0.5Âµm to 3mm the percentage removal of Ni(II) ion decrease from 52% to 33%. Finally by increasing the initial concentration of Ni(II) ion from 50 to 1000 mg L-1, the adsorption capacity also increase from 24% to 43%. The ANN models present high correlation coefficient (RÂ²=1) was found to perform excellently in predicting the adsorption behaviour of nickel in aqueous solutions onto EAFS.

**Keyword:** Nickel; Electric arc furnace slag; Adsorption; Artificial neural network (ANN)