

Manganese removal from aqueous solution by steel slag: kinetic and equilibrium studies

ABSTRACT

Batch experiments were conducted to evaluate the ability of steel slag in removing manganese from aqueous solution. Several variables had been setup to evaluate the performance of steel slag to remove manganese from aqueous solution in different experimental condition. The variables include contact time, size, dosage, pH and initial concentration of manganese. The equilibrium contact time was achieved at 10 hours. The small size of adsorbent has the higher removal of manganese from aqueous solution compared to the large size. 1 g of adsorbent of dosage is considered enough to remove heavy metal from aqueous solution. The optimum pH for manganese adsorption onto steel slag was 6. Higher initial concentration leads to the decrease in percentage removal of Mn from solution, but increase in adsorption capacity. The Langmuir isotherm models fit well with data of Mn adsorption on steel slag compared to Freundlich isotherm model. Kinetic test using several models indicate that data obtained fit well with the pseudo second order model. Steel slag are capable to remove to remove high percentage of Mn from aqueous solution (>95%) thus suggesting that steel slag has the potential to be used in real application.

Keyword: Batch experiment; Adsorption; Steel slag; Manganese; Isotherm model; Kinetic test