

Kinetic and isotherm studies for lead adsorption from aqueous phase on carbon coated monolith

Abstract

Adsorption of lead [Pb(II)] ions on two different types of carbon coated monoliths (CCM 600 and CCM 8000) was investigated with variations in the parameters such as agitation speed, pH, contact time, and Pb(II) initial concentration. Optimum Pb(II) adsorption was observed at pH: 5. The observed equilibration time on CCM 600 and CCM 8000 was 470 min and 350 min, respectively while, the equilibrium adsorption capacities were 14.2 mg/g and 15.2 mg/g at 50 mg/L initial Pb(II) concentration. The adsorption capacities on CCM 600 and CCM 8000 increased to 48 mg/g and 53.5 mg/g at 250 mg/L initial Pb(II) concentration. Linear and non-linear isotherm studies showed that equilibrium data better fitted to Freundlich isotherm model. Kinetic studies showed better applicability of pseudo-second order kinetics model. It was concluded that CCM 8000 showed better performance for Pb(II) ions removal compared to CCM 600.

Keyword: Lead; Carbon coated monoliths; Chemisorption