Convergence Strategy of Nano-Technology to Water Treatment Technology in KOREA: Nano Catalytic Adsorbent Material Development for Water Treatment

Sang-hyup LEE

Korea Institute of Science and Technology

Abstract

Phenolic resin-based carbon foam was prepared as an adsorbent for removing heavy metals from aqueous solutions. The surface of the produced carbon foam had a well-developed open cell structure and the specific surface area according to the BET model was 458.59 m^2 g^{-1}. Batch experiments showed that removal ratio increased in the order of copper (19.83%), zinc (34.35%), cadmium (59.82%), and lead (73.99%) in mixed solutions with the same initial concentration (50 mg L^{-1}). The results indicated that the Sips isotherm model was the most suitable for describing the experimental data of lead and copper. The obtained pore diffusion coefficients for lead and copper were found to be 1.02×10^{-6} and 2.42×10^{-7} m^2 s^{-1}, respectively. Post-sorption characteristics indicated that surface precipitation was the primary mechanism of lead and copper removal by the carbon foam, while the functional groups on the surface of the foam did not affect metal adsorption.