Synthesis of poly (styrene-divinyl benzene) magnetic porous adsorbents prepared by sulfonation for the adsorption of 2,4-dichlorophenol and 2,4,6-trichlorophenol from aqueous solutions

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Received 18 November 2013; Accepted 13 July 2014

ABSTRACT

Poly(styrene-divinyl benzene) (St-DVB) magnetic porous microspheres were prepared by sulfonation for the adsorption of 2,4-dichlorophenol(2,4-DCP) and 2,4,6-trichlorophenol (2,4,6- TCP) from aqueous solution. The as-prepared microspheres were characterized by FT-IR, XRD, SEM, TGA, VSM, and N\textsubscript{2} adsorption–desorption techniques, showing that the as-prepared microspheres were porous and had good magnetism (Ms = 40 emu g\textsuperscript{−1}). The adsorption performance of St-DVB magnetic porous microspheres were investigated by batch mode adsorption experiments with respect to pH, temperature, initial concentration, and contact time. The St-DVB magnetic porous microspheres were sensitive to pH. The equilibrium data was better fitted to the Langmuir isotherm model than the Freundlich model. The kinetics experimental data was well fitted to the pseudo-second-order model. The thermodynamic parameters were calculated by the Gibbs free energy function, revealing that the adsorption process was spontaneous and endothermic. Furthermore, the St-DVB magnetic porous microspheres had good recycling performance.

Keywords: Suspension polymerization; Sulfonation; Magnetic porous adsorbent; 2,4-Dichlorophenol; 2,4,6-Trichlorophenol; Adsorption

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