



A novel nanopore biopolymer multi adsorbent for simultaneous removal of anionic and cationic mixtures

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ABSTRACT

A novel nanopore biopolymer alginate gel bead impregnated with surfactant-modified zeolite (SMZ) and powdered activated carbon (PAC) is developed for simultaneous removal of anionic and cationic compounds from wastewaters. Cadmium and nitrate were used as a representative of cationic and anionic compounds, respectively. Testing different aspect ratio of alginate, SMZ and PAC showed that 3:4:1 (alginate:SMZ:PAC) is the best aspect ratio. The removal percent of (99.8%) cadmium is more powerful in cationic removal than the removal percent of (56%) nitrate in anionic removal. Isothermal study showed that Temkin is the governing equation for nitrate sorption, and Freundlich is the governing equation for cadmium sorption. Pseudo-second-order model is the governing equation for both nitrate and cadmium sorption. Although nitrate presence in the solution with different concentrations has no significant effect on cadmium sorption, but the cadmium presence will enhanced the nitrate sorption which is related to nitrate-cadmium clates. Because of activated carbon ability for organic pollutant removal, this sorbent can also be used for treating organic pollutants.

Keywords: Multisorbent; Alginate; Zeolite; Activated carbon; Cadmium; Nitrate; Organic; Pollutants

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