Optimisation of arsenic adsorption from water by carbon nanofibres grown on powdered activated carbon impregnated with nickel

ABSTRACT

Contamination of water due to arsenic (As) is increasing in many parts of the world. The removal of As from aqueous solution by using impregnated carbon nanofibres (CNFs) as the adsorbent is reported in this paper. The effects of pH, CNFs dosage, contact time and initial concentration of arsenic were studied at room temperature (±25°C). The interactions among the parameters were also investigated. The data obtained from the adsorption experiment were analysed using statistical software in order to develop a regression equation to represent the optimum operating conditions. The interactions of each parameters were considered during this analysis and the result indicated that the highest removal (97.25%) of As can be attained at pH 6, initial concentration of arsenic of 0.08 mg L-1, contact time of 60 min and CNF dosage of 200 mg L-1. Comparison between impregnated CNF and Powdered Activated Carbon (PAC) were also done and it is determined that impregnated CNF has better removal compared to PAC alone. The final concentration of As after the treatment using CNFs was about 8 ~ 10 times less than that of using PAC. Therefore, it can be concluded that CNFs are highly potential for the adsorption of As from water.

Keyword: Adsorption; Arsenic; Carbon nanofibres; Optimum condition and impregnated powdered activated carbon