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Parametric study on the adsorption of electrospun PCL nanocomposite mat

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The feasibility of aqueous arsenic removal via dynamic adsorption column using electrospun Polycaprolactone (PCL) nanofibrous mat as adsorbent was investigated. The adsorbent is composed of polycaprolactone and Fe-MMT, in which the former serves as the matrix of the latter and was produced through the electrospinning technique. The response of the adsorbent under different operating conditions such as initial influent concentration (2 ppm and 8 ppm arsenic spiked water), flow rate (20ml/min and 40ml/min) and thickness of adsorbent (0.25mm and 0.50mm) were studied. A 2^k factorial design of experiment was adapted to determine the significant factors. Parametric analysis show that all single factors (flow rate, initial influent concentration and thickness of adsorbent) were found to have significant effect on the breakthrough time. Tests revealed that at higher flow rate and initial influent concentration the breakthrough time was achieved faster, on the other hand, increasing the thickness of adsorbent sheets would make the breakthrough time longer.

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