

Lead adsorption in a serpentine millichannel-based packed-bed device: Effect of hydrodynamics and mixing characteristics

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Abstract

The present study depicts the hydrodynamics along with the mixing characteristics inside a millichannel-based serpentine fixed-bed device to attain the particular demands of the fabrication of the miniature adsorption devices. Residence Time Distribution (RTD) analyses were accomplished to analyze the velocity distribution inside the packed bed geometry. The operating variables effect the hydrodynamics, mixing, and the lead adsorption characteristics, which were pronounced clearly in the present context. Depending on the results obtained in the experiment, the new correlations were proposed. The parametric effects on the lead ions adsorption were studied in the same millichannel geometry packed with the graphene oxide (GO) coated glass beads. Thomas model was utilized to investigate the kinetics of the adsorptive removal process. The regeneration study of the said millichannel-based fixed-bed device was also executed.

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