

Characterization and adsorptivity of polyethylenimine/polyvinyl chloride crosslinked fiber adsorbent for removal of reactive dyes from aqueous solution

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This study presents a simple method for the fabrication of polyethylenimine (PEI)/polyvinyl chloride (PVC) crosslinked fibers (PEI/PVC-CFs) via alkylation reactions at various synthetic conditions. To develop a promising adsorbent for the adsorption of Reactive Yellow 2 (RY2), the effects of the mixing ratio of PEI:PVC and reaction time were tested. As a result, the best PEI/PVC-CF could be fabricated at the manufacturing conditions of 1.25:1 (mixing ratio), 6 h (reaction time), and 80 °C (reaction temperature). The surface of the developed adsorbent was characterized using SEM and BET analyses. In addition, the batch experiments such as kinetics and isotherms were carried out to evaluate the adsorption performance of the adsorbent for RY2 removal. From the results of batch experiments, the adsorption equilibrium was reached within 12 h at the initial dye concentration of 100 mg/L. The maximum RY2 uptake was predicted to be 850.55 mg/g by the Langmuir isotherm model, which is much higher than those of other sorbents reported in literature.