Removal of Cr(VI) from aqueous solution by using polyaniline/polycarbonates nanofibers composite: central composite design, isotherm, and error analysis

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ABSTRACT

Polyaniline/polycarbonates (PANI/PC) nanofibers composite were synthesized chemically for the removal of Cr(VI) from an aqueous solution. The nanofibers were characterized using X-ray diffraction (XRD) and scanning electron microscopy (SEM). Central composite design with response surface methodology (CCD-RSM) was used for optimized some factors such as pH, the weight of PANI/PC, temperature, and contact time. The best removal (98.8%) occurred under pH 2, the weight of PANI/PC 0.05, temperature 25°C, and contact time 60 min. The high value of R^2 and minimized value of error functions (χ^2, χ^2_{red}, and G^2) indicated that the Freundlich isotherm model was found to be the better model rather than Langmuir and Temkin models. According to the results of XRD and SEM, affected factors using CCD-RSM, isotherm model, and error functions were involved in the adsorption process. All the results indicated that PANI/PC nanofibers composite could be used as a promising surface for the removal of Cr(VI).

Keywords: CCD-RSM; Removal Cr(VI); PANI/PC nanofibers; Log-likelihood (G^2)

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