

عنوان مقاله:

Application of Response Surface Methodology for Optimization of Platinum(IV) Adsorption Using Magnetic Cellulose Nanoparticles Modified with Ethylenediamine

محل انتشار:

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خلاصه مقاله:

The current study adsorption characteristics of platinum(IV) onto the ethylenediamine-modified magnetic cellulose nanoparticles (MCNGE) have been investigated. The prepared adsorbent were characterized using Fourier transform spectroscopy (FT-IR), X-ray diffraction (XRD), Scanning electron microscopy (SEM) techniques. Optimization the experimental parameters namely Pt(IV) concentration (15-35 mg/l), temperature (34–50 °C), pH of solution (2–5), and particles dose (0.03-0.06 g) were performed using a means of central composite design (CCD) and response surface methodology (RSM). Analysis of variance (ANOVA) was conducted to evaluation the model, the main of the independent variables and their interactions for adsorption of Pt(IV) from aqueous solution. The results of the quadratic model indicated that the model was highly significant with F value ($F_{\text{model}} = 55.09$) and value of $\text{prob} > F$ (< 0.0001). The optimum adsorption conditions were determined as initial pH 2.5, temperature 46°C, adsorbent dosage 0.05 g and initial platinum(IV) ion concentration 22 mg/l. The maximum capacity of MCNGE for Pt(IV) was found to be 19.45 mg/g. The magnetic cellulose nanoparticle is an environmental friendly product with low energy costs in adsorption of heavy metals from aqueous phase.

کلمات کلیدی:

Adsorption, Magnetic nano adsorbent, Cellulose, Ethylene diamine, Platinum (IV)

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