Preparation and sorption behavior of DEAE-cellulose-thiourea-glutaraldehyde sorbent for Pt(IV) and Pd(II) from leaching solutions

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ABSTRACT

This work investigates the adsorption behavior of Diethylaminoethyl-cellulose-thiourea-glutaraldehyde (DEAE-C/TU/GA) sorbent, which was synthesized through the reaction of crosslinking of glutaraldehyde using thiourea for platinum (Pt(IV)) and palladium (Pd(II)) ions from leaching solutions. The effects of pH and adsorption parameters, such as the sorbent dosage, contact time, temperature, and adsorption isotherms, were studied. Furthermore, chemical adsorption kinetic studies for adsorptions of these metal ions were carried out. The adsorption equilibrium data were fit better using the Langmuir model than the Freundlich model. The activation energies ($E_a$) of Pt(IV) and Pd(II) were 77.70 and 23.03 kJ/mol, respectively. The best desorption reagent was 1.0 M HCl–1.0 M TU solution for both Pd(II) and Pt(IV), which could remove more than 85% of the Pt(IV) and Pd(II) in the fourth adsorption–desorption cycle.

**Keywords:** DEAE-cellulose; Adsorption; Platinum; Palladium; Leaching solutions

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