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خلاصه مقاله:

The purpose of this study is to investigate and optimize parameters effective on continuous adsorption and elution and study of the corresponding breakthrough curve models for the removal of one of the main pollutants found when copper is extracted and refined. Mining has a long history of producing toxic waste so there is a heightened sense of urgency for finding ways to protect the environment especially during the initial production stages. The contaminants in water and mine wastewater are key issues in the reuse of water resources. In this study, adsorption by fixed-bed column which is usually applied for removing organic contaminants from the aqueous phase is investigated for adsorption of the antimony on a commercially available cationic resin Purolite S۹۵۷ and the kinetics of adsorption is explored by establishing breakthrough and resin saturation times. Concentration and feed flow rate affect the kinetics of adsorption on a fixed-bed resin and were determined both experimentally as well as through optimization by a two-level factorial experimental design using Central Composite Design (CCD). Experiments were carried out at constant temperature and pH of ۵۵ and ۸ respectively that were determined based on optimal conditions for fixed resin content of ۲۵ g. The breakthrough test results suggest Bohart-Adams model better fitted the experimental data compared to Thomas and Yan models with R² of ۰.۹۶۴. Moreover, elution of pure antimony occurred at ۱۵ BV of elution solution and maximum concentration of antimony was achieved at about ۳۰۰ mg.L- ۱

کلمات کلیدی:

breakthrough curve, Bohart-Adams model, Thomas model, Yan model, elution

لینک ثابت مقاله در پایگاه سیویلیکا: