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The Purification of Waste Printing Developer with the Fixed Bed Adsorption Column

Authors : Kiurski S. Jelena, Ranogajec G. Jonjaua, Kecić S. Vesna, Oros B. Ivana

Abstract : The present study investigates the effectiveness of newly designed clayey pellets (fired clay pellets diameter sizes of 5 and 8 mm, and unfired clay pellets with the diameter size of 15 mm) as the beds in the column adsorption process. The adsorption experiments in the batch mode were performed before the column experiment with the purpose to determine the order of adsorbent package in the column which was to be designed in the investigation. The column experiment was performed by using a known mass of the clayey beds and the volume of the waste printing developer, which was purified. The column was filled in the following order: fired clay pellets of the diameter size of 5 mm, fired clay pellets of the diameter size of 8 mm, and unfired clay pellets of the diameter size of 15 mm. The selected order of the adsorbents showed a high removal efficiency for zinc (97.8%) and copper (81.5%) ions. These efficiencies were better than those in the case of the already existing mode adsorption. The obtained experimental data present a good basis for the selection of an appropriate column fill, but further testing is necessary in order to obtain more accurate results.

Keywords : clay materials, fix bed adsorption column, metal ions, printing developer
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