

Removal of ^{60}Co and ^{134}Cs radionuclides from aqueous solution using titanium tungstate ion exchanger

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ABSTRACT

A weakly crystalline titanium tungstate with Ti:W ratio of 1:1.3 has been prepared and evaluated as a novel inorganic ion exchange resin for the separation of some radioactive isotopes. The product was characterized using X-ray diffraction, FTIR-spectra, thermal analysis and finally X-ray fluorescence. The selectivity behavior of the exchanger was determined for cesium and cobalt ions at concentration range 10^{-2} – 10^{-4} M. The distribution coefficients for both ions were also, evaluated at different nitric acid concentrations. The adsorption results obey Freundlich isotherm and the values of adsorption capacity and intensity were computed for both ions. The different thermodynamic parameters, ΔH (4.45, 13.7 kJ/mol), ΔS (46.5, 68.66 J/mol/deg) and ΔG (–9.61, –7.1 kJ/mol) for the adsorption of cesium and cobalt ions have been reported, respectively.

Keywords: Ion exchange; Titanium tungstate; Characterization; Capacity; Distribution coefficients; Adsorption isotherm; Column
