

Radiation-chemical synthesis of sorption-active fibers with ethylenediamine groups and studies on their interaction with uranium (VI) ions

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Sorption-active material based on polypropylene nonwoven fibers carrying amine-type functional groups was synthesized by radiation-induced graft polymerization of glycidyl methacrylate (GMA) with subsequent chemical modification of the epoxy groups of poly-GMA graft chains with ethylenediamine at 70 °C.

The amination process and conversion of the epoxy groups into the functional amine groups was investigated as a function of the degree of GMA grafting. It was found insignificant increase in the density of incorporated ethylenediamine groups (from 2.1 to 3.5 mmol/g) and decrease in the conversion efficiency (from 70 to 55 %) with increasing GMA grafting degree from 125 to 320%.

Synthesized fibers were examined for uranium (VI) ions adsorption under non-competitive conditions in a series of batch adsorption experiments. The influence factors on uranium adsorption as contact time, initial uranium concentration, pH value, ethylenediamine groups' density were investigated in detail.