

Radiation-chemical synthesis of sorption-active polypropylene fabric with diethylenetriamine-type functional groups

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Sorption-active material based on polypropylene nonwoven fabric 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 diethylenetriamine(DETA) at 70°C.

The amination process and conversion of the epoxy groups into the functional groups was investigated as a function of the degree of GMA grafting. It was found insignificant increase in the density of incorporated DETA groups and decrease in the conversion efficiency with increasing GMA grafting degree. DETA-type adsorbent was examined for copper and cobalt ions adsorption under non-competitive conditions in a series of batch adsorption experiments at pH~4. The sorption rate of the synthesized adsorbent was relatively slow. Although about 50% uptake of studied ions was achieved during the first 2 h of contact time, the adsorption uptakes were accomplished after 48 h.

Adsorption capacity was found to increase with contact time and initial ion concentration in solution.