

Chemical synthesis of metal oxide-coated polymer fibers and their application for the removal of Sr (II) from water effluents

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Use of fission reactors for production of energy generates considerable amounts of radioactive liquid wastes in almost all phases of the nuclear fuel cycle. The decontamination of liquid wastes before final underground disposal or release to nature is an important task, which requires extremely effective materials and techniques. The adsorption characteristics of the hybrid adsorbents were investigated with respect to effect of the adsorption parameters as contact time, initial ion concentration, and pH of the solution and interference of the coexisting ions. The adsorption studies revealed that the Sr uptake onto synthesized fibers is a fast process and about 90% of the uptake occurred within the first 30 min contact time, while the adsorption process was found to last even after 2 weeks. Accordingly, adsorption can be described as a two-step process: a rapid and reversible adsorption reaction to the external surface is followed by a slow diffusion inside of the micropores of the oxides nanoparticles.