

Synthesis of Cubic Prussian Blue Nanoparticles coated Graphene foam for radioactive cesium adsorption from aqueous solutions

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Scientific and technological advances relating to removal of radioactive contaminant are important in environmental and engineering research in the world. Cs is the main radioactive contaminant that is currently present in a wide area of eastern Japan since the Fukushima Daiichi Nuclear Power Plant Disaster. The radionuclide of ¹³⁷Cs, which has a half-life of 30 years, is hazardous as it exerts toxic effects via beta-particles and strong gamma rays. Graphene oxide (GO) has recently attracted a great deal of attention for its potential applications. In particular, graphene-inorganic materials can exhibit excellent properties and improved functionalities. Prussian blue (PB) nanoparticles, as a good class of an inorganic ion-exchanger, exchanges its potassium ions for cesium ions because of their high affinity to Cs in an aqueous solution. In this study, we describe the fabrication of novel Prussian Blue nanoparticles coated with graphene oxide foam, Graphene and PB nanoparticles would help improve adsorbent's properties: (1) enhancing surface area as a scaffold; (2) high adsorption capacity. These foams are believed to hold great promise for the clean-up of ¹³⁷Cs contaminated water after nuclear accidents.