Electrospsun Prussian Blue Composite Nanofibers for Removal of Cesium Ions from Aqueous Solutions

조우현, 김 찬[1], 이재욱†
조선대학교; [1]아모그린텍
(jwlee@chosun.ac.kr†)

An efficient cesium adsorbent composed of Prussian blue (PB) fibers was developed by the electrospinning method using polyvinyl pyrrolidone as a precursor. The samples were characterized by scanning electron microscopy, energy-dispersive X-ray spectroscopy, thermogravimetric analysis, the Brunauer-Emmet-Teller method. The adsorption equilibrium data were obtained at different temperatures and fitted with the Langmuir isotherm. The thermodynamic properties, including the Gibbs free energy, enthalpy, and entropy, were evaluated by applying the Van't Hoff equation. The adsorption of cesium on PB fibers increased with increasing temperature (i.e., endothermic adsorption). The adsorption isotherm data showed good correlation with the Langmuir isotherm and the maximum adsorption capacity was 8 mg/g. The positive value of the standard enthalpy change suggests that the adsorption of cesium onto the PB fibers is endothermic, while the negative standard free energy indicates that the adsorption is a spontaneous process. It was found that the novel PB fibers could efficiently remove radioactive cesium dissolved in water