Synthesis of electrically active switched ion exchange electrode for the removal of cesium ion

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Abstract

Radioactive waste contains many important elements like cesium ion. Generally, the separation of these elements is expensive and exotic. However, electrically switched ion exchange (ESIX) process is attractive method for separation which involves an ion exchange film deposited onto an electrode surface. In this study, a graphite electrode was used and nickel hexacyanocobaltate was introduced into the graphite electrode to improve the capacity for cesium ion separation. X-ray tomography was used to characterize nickel hexacyanocobaltate inside the electrode and FTIR was used to characterize the prepared material. Cyclic voltammogram was used to measure the ion exchange performance. This technique was found to enhance both the removal capacity of cesium and stability of the ion exchange process compared to other techniques.

Keywords: Electrically switched ion exchange (ESIX), Graphite, ion separation, selectivity to cesium, nickel hexacyanocobaltate (NiHCCo), electroactive films.