

International Conference on the Management of Naturally Occurring Radioactive Materials (NORM) in Industry

VIRTUAL EVENT

International Conference on
**Management of Naturally
Occurring Radioactive
Material (NORM) in Industry**

19–30 October 2020

#NORM2020



Contribution ID: 273

Type: **Poster**

ADSORPTION AND DESORPTION OF THORIUM AND URANIUM BY RADIATION MODIFIED NONWOVEN FIBERS

This study was mainly focused on the explication of adsorption and desorption mechanisms for the removal of thorium and uranium from aqueous solution by nonwoven polyethylene/polypropylene (NWPP) fiber based adsorbent. The NNPP were grafted with primary amine group by radiation induced graft polymerization technique. The effect of pH, contact time, initial concentration and grafting yield onto adsorption of thorium and uranium were studied thoroughly. The best fitting for the adsorption data acquired for both thorium and uranium were pseudo-second-order. The obtained results also clearly indicates that the adsorption characteristic of both thorium and uranium obeys the Langmuir adsorption isotherm with the maximum adsorption capacity of 84.4 and 62.6 mg/g for both thorium and uranium, respectively. The functional primary amine groups that grafted onto NWPP were responsible for coordination of thorium and uranium during adsorption process which had eventually form coordination compounds. Therefore, good adsorption capacity was observed. The desorption study was performed in different acid solution at various concentration in order to acquire maximum yield. The regeneration of the synthesized NWPP adsorbent had been tested as well. The optimum desorption percentage obtained was around 95 % and 92 % for thorium and uranium in the 0.1 M HNO₃ solution. It is also proven that 0.1 N HNO₃ was the most suitable eluent for desorption of thorium and uranium in the adsorption/desorption with eight cycles of regeneration. Regeneration of NWPP adsorbent after elution of thorium and uranium were carried out by treatment with 0.5 N NaOH solution.

Primary author: Mrs SELAMBAKKANNU, Sarala (Malaysia Nuclear Agency)

Co-authors: Dr OTHMAN, Nor Azillah Fatimah (Malaysia Nuclear Agency); Dr TING, Teo Ming (Malaysia Nuclear Agency)

Presenter: Mrs SELAMBAKKANNU, Sarala (Malaysia Nuclear Agency)

Session Classification: Session VI - Solutions for Residue and Waste Management

Track Classification: NORM Residue and Waste Management