Accepted Manuscript

Title: Separation of Actinides from Spent Nuclear Fuel: A Review

30-6-2016

8-7-2016

Author: Jessica Veliscek-Carolan

Revised date:

Accepted date:



PII: DOI: Reference:	S0304-3894(16)30648-3 http://dx.doi.org/doi:10.1016/j.jhazmat.2016.07.027 HAZMAT 17883
To appear in:	Journal of Hazardous Materials
Received date:	7-4-2016

Please cite this article as: Jessica Veliscek-Carolan, Separation of Actinides from Spent Nuclear Fuel: A Review, Journal of Hazardous Materials http://dx.doi.org/10.1016/j.jhazmat.2016.07.027

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Separation of Actinides from Spent Nuclear Fuel: A Review

Jessica Veliscek-Carolan^a

^a Australian Nuclear Science and Technology Organisation, Locked Bag 2001, Kirrawee DC, NSW, 2232, Australia Email: jvc@ansto.gov.au Phone: +61 2 9717 7251

Abstract

This review summarises the methods currently available to extract radioactive actinide elements from solutions of spent nuclear fuel. This separation of actinides reduces the hazards associated with spent nuclear fuel, such as its radiotoxicity, volume and the amount of time required for its' radioactivity to return to naturally occurring levels. Separation of actinides from environmental water systems is also briefly discussed. The actinide elements typically found in spent nuclear fuel include uranium, plutonium and the minor actinides (americium, neptunium and curium). Separation methods for uranium and plutonium are reasonably well established. On the other hand separation of the minor actinides from lanthanide fission products also present in spent nuclear fuel is an ongoing challenge and an area of active research. Several separation methods for selective removal of these actinides from spent nuclear fuel will be described. These separations, as well as the less developed but promising use of adsorption and ion-exchange materials.

Keywords: actinide, nuclear, separation, solvent extraction, adsorption

Highlights

- Technical review
- Separation processes for actinide removal from solutions of spent nuclear fuel
- Solvent extraction, ion exchange and adsorption methods described
- Efficiency and selectivity of separation methods compared
- Kinetics, hydrolytic and radiolytic stability considered

Download English Version:

https://daneshyari.com/en/article/6969987

Download Persian Version:

https://daneshyari.com/article/6969987

Daneshyari.com