Accepted Manuscript

$U\text{-}PuO_2$, U-PuC, U-PuN cermet fuel for fast reactor

Sudhir Mishra, Santu Kaity, Joydipta Banerjee, Chiranjeet Nandi, G.K. Dey, K.B. Khan

PII: S0022-3115(17)31277-1

DOI: 10.1016/j.jnucmat.2017.11.010

Reference: NUMA 50618

To appear in: *Journal of Nuclear Materials*

Received Date: 12 September 2017

Revised Date: 3 November 2017

Accepted Date: 7 November 2017

Please cite this article as: S. Mishra, S. Kaity, J. Banerjee, C. Nandi, G.K. Dey, K.B. Khan, $U\text{-}PuO_2$, U-PuC, U-PuN cermet fuel for fast reactor, *Journal of Nuclear Materials* (2017), doi: 10.1016/j.jnucmat.2017.11.010.

U-PuO_2, U-PuC, U-PuN Cermet Fuel for Fast Reactor

Sudhir Mishra[1]*, Santu Kaity[1], Joydipta Banerjee[1], Chiranjeet Nandi[1], G.K.Dey[2] and K B Khan[1]

[1]Radiometallurgy Division

[2]Materials Science Division

Bhabha Atomic Research Centre, Trombay, Mumbai 400 085, India

Abstract

Cermet fuel combines beneficial properties of both ceramic and metal and attracts global interest for research as candidate fuel for nuclear reactors. In the present study, U matrix PuC/ PuN/ PuO_2 cermet for fast reactor have been fabricated on laboratory scale by powder metallurgy route. Characterization of the fuel has been carried out using Dilatometer, Differential Thermal analysis (DTA), X-ray diffractometer and Optical microscope. X ray diffraction study of the fuel reveals presence of different phases. The PuN dispersed cermet was observed to have high solidus temperature as compared to PuC and PuO_2 dispersed cermet. Swelling was observed in U matrix PuO_2 cermet which also showed higher thermal expansion. Among the three cermets studied, U matrix PuC cermet showed maximum thermal conductivity.

Key words: Cermet, fabrication, powder metallurgy, characterization, fast reactors

*E-mail address: sudhir@barc.gov.in

Telephone: +91 22 25595364