

Development of Monolithic Nuclear Fuels for RERTR by Hot Isostatic Pressing

by

Jan-Fong Jue, Blair Park, Michael Chapple, Glenn Moore, and Dennis Keiser
Idaho National Laboratory
P.O. Box 1625
Idaho Falls, ID 83415, USA

The RERTR Program (Reduced Enrichment for Research and Test Reactors) is developing advanced nuclear fuels for high power test reactors. Monolithic fuel design provides a higher uranium loading than that of the traditional dispersion fuel design. In order to bond monolithic fuel meat to aluminum cladding, several bonding methods such as roll bonding, friction stir bonding and hot isostatic pressing, have been explored. Hot isostatic pressing is a promising process for low cost, batch fabrication of monolithic RERTR fuel plates. The progress on the development of this process at the Idaho National Laboratory will be presented. Due to the relatively high processing temperature used, the reaction between fuel meat and aluminum cladding to form brittle intermetallic phases may be a concern. The effect of processing temperature and time on the fuel/cladding reaction will be addressed. The influence of chemical composition on the reaction will also be discussed.