


INTERNATIONAL NUCLEAR ENERGY RESEARCH INITIATIVE

Development of Head-end Pyrochemical Reduction Process for Advanced Oxide Fuels

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Project Number: 2005-004-K

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Project Start Date: October 2005

Collaborators: None

Project End Date: September 2008

Project Abstract

Pyroprocessing can be a very effective method for producing stable waste forms from the highly radioactive fission products found in spent nuclear fuel. This is of great interest to both the United States and the Republic of Korea (ROK) for the purpose of closing the fuel cycle for Generation IV fast reactors. However, pyroprocessing was originally developed for treating metal fuels, while the primary feed material for this process may be oxide spent fuel. A proposed solution to this problem is to develop a process for converting spent oxide fuel into a metallic form.

The United States and the ROK have been active in developing pyrochemical conversion methods for producing

feed material that is compatible with pyroprocessing. Both countries favor this electrolytic reduction method, referred to as "oxide reduction." While significant advances have been made in oxide reduction over the last decade, including electrolytic reduction, a number of important technical issues need to be resolved in order to properly assess implementation of this technology.

This research project combines the expertise and unique capabilities of the Idaho National Laboratory and KAERI to make advances towards designing an economical, high-throughput oxide reduction process. The project will focus on two technical issues: 1) the effect of fission products and 2) process scalability.