

# International Nuclear Energy Research Initiative

## U.S. DEPARTMENT OF ENERGY INTERNATIONAL NUCLEAR ENERGY RESEARCH INITIATIVE DOE/ROK

### ABSTRACT

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#### Alternative Methods for Treatment of TRISO Fuels

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National Laboratory (ANL)

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**Principal Investigator (Republic of Korea):** E.H.  
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**Project End Date:** May 2007

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The United States (U.S.) Department of Energy (DOE) Advanced Fuel Cycle Initiative (AFCI) and the Advanced Spent Fuel Conditioning Process (ACP) of the Korea Atomic Energy Research Institute (KAERI) are developing transmutation strategies for separating and transmuted the transuranic (Pu, Np, Am, and Cm) and long-lived fission products ( $^{99}\text{Tc}$  and  $^{129}\text{I}$ ) contained in spent nuclear fuel. Among the current inventory is coated particle TRISO fuel from High Temperature Gas Reactors (HTGR). TRISO fuel particles have four layers surrounding the fissile material: porous carbon, inner pyrolytic carbon, silicon carbide barrier coating, and outer pyrolytic carbon. Current methods in the treatment of TRISO fuel call for dry mechanical crushing and/or grinding using a crusher assembly and an attritor grinding mill for breaching the outer pyrolytic carbon and silicon carbide layers of the fuel particle. The objective of this collaborative project is to develop alternative methods for breaching the protective outer layers of spent TRISO nuclear fuel and explore new separation methods for the resulting fines and fuel.

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