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An Investigation on Fuel Meats Extruded with Atomized U-10wt% Mo Power for Uranium High-Density Dispersion Fuel

Chang-Kyu Kim, Ki-Hwan Kim, Jong-Man Park, Don-Bae Lee, Dong-Seong Sohn

Korean Atomic Energy Research Institute
150, Dukjin-Dong, Yusong-Ku, Taejon 305-353, Korea

ABSTRACT

The RERTR program has been making an effort to develop dispersion fuels with uranium densities of 8 to 9 g U/cm³ for research and test reactors. Using atomized U-10wt%Mo powder, fuel meats have been fabricated successfully up to 55 volume % of fuel powder. The uranium density of an extruded meat with a 55 volume % of fuel powder was obtained to be 7.7 g/cm³. A relatively high porosity of 7.3% was formed due to cracking of particles, presumably induced by the impingement among agglomerated particles. Tensile test results indicated that the strength of fuel meats with 55% volume fraction decreased some and a little of ductility was maintained. Examination on the fracture surface revealed that some U-10%Mo particles appeared to be broken by the tensile force in brittle rupture mode. The increase of broken particles in high fuel fraction is considered to be induced mainly by the impingement among agglomerated particles. Uranium loading density is assumed to be improved through the development of the better homogeneous dispersion technology.

Contact:

Dr. C. K. Kim

Nuclear Materials Development Dept.

KAERI

PO Box 7, Daeduk-Danji

Teajon 305-606, Korea

Tel.: +82-42-868-2309

Fax: +82-42-868-8346

[ARGONNE NATIONAL LABORATORY](#), [Nuclear Engineering Division](#)

9700 South Cass Ave., Argonne, IL 60439-4814

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