# The Effects of Volume Fraction and Fuel Particle Shape on Green Properties of U-10Mo/Al and U3Si2/Al Powder Compacts

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Abstract

The effects of volume fraction and fuel particle shape on green properties were investigated in U-10Mo/Al and U3Si2/Al powder compacts at the compacting pressure range of 50-400MPa. The relative density of the compacts increases with decreasing volume fraction of fuel powder. The compressibility of comminuted powder compacts was larger than that of the atomized powder compacts due to the fragmentation of comminuted particles, and the compressibility of the compacts of U-10Mo was larger than that of the compacts of U3Si2 due to the deformation of U-10Mo particles. The green strength of comminuted powder compacts is higher than that of the atomized powder compact. This seems to have resulted from the smaller pore size and the larger contact area between the comminuted fuel powders and Al powders. It is suggested that the compacting condition adjustment be required to fabricate the atomized powder compacts having comparable green strength

# Parametric Study on In-reactor Behavior of Metallic Fuel Rod in LMR

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Abstract

Fuel design is a key feature to assure LMR safety goals. To date, a large effort has been devoted to the development of the MACSIS code for metallic fuel rod design and the evaluation of operational limits under irradiation conditions. The MACSIS code had been partly benchmarked on temperature profile, FGR, fuel swelling and other results of U-Pu-Zr metal fuel irradiated in LMRs, and it was used in the fuel performance analysis of this work. The major design and performance parameters investigated include: temperature profile, smeared-density, axial plenum size, FCMI and cladding deformation including creep, fission gas release and swelling. Key design characteristics according to the variations of metallic fuel rod design parameters are also analyzed using the MACSIS code. The performance limits, which must be considered in the design of metallic fuel rods for LMR, are proposed and discussed.