Molybdenum-Rhenium Alloys for Spacecraft Reactor Applications

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Various Mo-Re alloys have been suggested for use as fuel cladding and core structural materials in spacecraft reactor applications. Molybdenum alloys with rhenium contents of 41% to 47.5% (wt%), in particular, have good ductility in both base metal and weldments. This paper reviews the current state-of-knowledge for Mo-Re alloys as the basis for judging their potential for spacecraft reactor applications. Mechanical properties in the irradiated and unirradiated condition will be discussed as functions of temperature and fluence. Yield strength, ductility, fracture toughness, and creep behavior are of particular interest. Fabrication, joining, compatibility, contamination issues and the impact of irradiation will also be discussed.

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