

Review of Tungsten Target Irradiation Experience at LANL

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Abstract

LANL has significant experience using tungsten as a spallation neutron source at the Los Alamos Neutron Science Center. Its high density and conductivity make it ideal for a target material but the interaction with spallation neutrons and protons during irradiation lead to high corrosion rates in water and significant embrittlement (reduction in ductility). Thus, it is used as a spallation neutron source for the Neutron Scattering Center and it is the prime candidate material for the neutron source for the Materials Test Station. Irradiations using the 800 MeV proton beam and lower energy ion beams have been used to quantify the effects of irradiation on mechanical properties and corrosion in tungsten. Hardness and compression test results have been measured after irradiation to doses up to 24 dpa using the LANSCE proton beam. In addition corrosion measurements were made to quantify the effects of irradiation on corrosion in tungsten under flowing water. A summary of this data will be presented as they are critical in design and lifetime predictions for solid spallation targets.