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Fabrication process of NpO2 pellets

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In order to increase dissolution ratio of the irradiated NpO2 targets, it's necessary to add a little diluent into NpO2 pellet. In this paper, pressureless sintering processes and microstructures of NpO2-10% CaO, NpO2-10%SrO, NpO2-10%MgO and NpO2-5%MgO pellets were studied, sintered at 1730℃ for 2 hours in Ar-5%H2 gases. Only NpO2 solid solution phase structure was found in all the pellets. NpO2-10%CaO pellet melts at the sintering process. NpO2-10%SrO pellet has a sintered density of 60.0% TD with cracking and porous microstructures. NpO2-10%MgO pellet has a sintered density of 83.1%TD with irregular grains. NpO2-5%MgO pellet can be sintered to 90.0%TD with cobble grains. Density of NpO2-5%MgO pellet will increase to 92.5%TD using UO2 powder embedded sintering process.

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