

## Nitrate Fusion Synthesis and Spark Plasma Sintering of Nanocrystalline Ytria Stabilized Hafnia

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Ytria and hafnia based ceramics are extensively in variety of high temperature applications due to its chemical inertness, structural stability and resilient to corrosion. Hence, they are widely used as oxygen gas sensors and thermal barrier coatings. Ytria stabilized hafnia could also serve as a candidate materials for holding molten actinide bearing alloys. In this study, nanocrystalline YSH powders were synthesized at a temperature as low as 673 K by using novel nitrate fusion technique. TEM investigations revealed that the powders comprised grain size of 10 – 25 nm while the SAED and the d-spacings measured from the SAED images confirmed the presence of cubic phase. The derived powders were sintered at 1873 K (100 K min<sup>-1</sup>; 50 MPa) by using SPS technique. The derived dense compacts were calcined in air at 1873 K for 1 h to remove the residual graphite and were analyzed for their phase, residual carbon and microstructure. EDS revealed the uniform distribution of Y and Hf in the YSH matrix.