

Thermo-Mechanical Experiments On Lithium Titanate Pebble Bed

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Among the various lithium ceramics, Li_2TiO_3 is one which has been received much attention due to its very excellent properties, such as reasonable lithium atom density, low activation, excellent tritium release performance and chemical stability, etc. Lithium Titanate [Li_2TiO_3] pebbles with the diameter of 1mm was widely used for the experiments after successful completion of variety of modeling and experiments. In the present study we have prepared lithium titanate from its high pure raw material of lithium carbonate and titanium dioxide by solid state reaction in the stoichiometric ratio. The reaction temperature has been estimated from the thermo-gravimetric and differential thermal analysis (TG-DTA) and the same scenario has been executed for the bulk production using high temperature furnace. The phase and phase stability at different temperature were analyzed by using powder X-ray diffractometer. The pebble preparation has been carried out from this raw material after once again ground them to fine powder and addition of PVA as a binder for the preparation of green pebbles using extruder-spheronizer technique. The green pebbles were sintered at high temperature to attain desired density for further studies. The details of the Li_2TiO_3 powder and pebble fabrication and their characterizations like XRD, density, porosity, crush load, SEM analysis, Young's Modulus and creep will be discussed in the paper.

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