Contribution ID: **636** Type: **Poster**

FTP/4-4Ra: Status of LLCB TBM R&D Activities in India

Friday, 12 October 2012 08:30 (4 hours)

The development of Lead-Lithium Ceramic Breeder (LLCB) blanket is being performed as the primary candidate of Indian Test Blanket Module (TBM) program towards DEMO reactor. The LLCB TBM will be tested from the first phase of ITER operation (H-H phase) in one-half of a ITER port no-2. Neutronic calculations for the above design of LLCB TBM blanket have been carried out to estimate tritium production rate and radial profiles of nuclear heating in the blanket. The thermal-hydraulic analysis have been carried out for both serial flow and parallel flow of PbLi . Based on this analysis LLCB design has been optimized. To study the MHD effects, lab scale liquid metal MHD experiments has been performed to understand MHD phenomena in complex flow geometries and to generate relevant MHD database for validation of MHD numerical code. Safety analysis has been carried out for the safety licensing of LLCB TBM system for ITER. A set of four reference accidents has been identified for complete LLCB TBM System. An in-house customized computer code is developed and through these deterministic safety analyses the prescribed safety limits are shown to be well within limits for Indian LLCB-TBM design and it also meets overall safety goal for ITER. Lead-Lithium loop construction involves development of critical components like electromagnetic pump, heat exchanger, recuperator, cold trap, flow meter, pressure transmitters etc. Series of experiments on compatibility of Pb-Li with candidate structural materials Indian specific RAFMS have been attempted to study corrosion effects. Two parallel experiments were conducted in Pb-Li buoyancy loop and in a electromagnetic pump pump driven loop in the presence and absence of magnetic field. The specimens were characterized using analytical tools such as Optical microscopy, Scanning electron microscopy, energy dispersive X- ray (SEM/EDX), EPMA. Lithium Titanate development is under progress through two techniques (1) Solid state reaction (2) Chemical solution based technique. Extruder Spherodization process was adopted for preparation of spherical pebbles. RAFM Steel development in India is based on the chemical composition of the conventional P91 steel is modified by substitution of highly radioactive element molybdenum by tungsten and niobium by tantalum. This paper will provide present status of TBM related R&D activities in India.

Country or International Organization of Primary Author

India

Primary author: Mr RAJENDRAKUMAR, Ellappan (India)

Presenter: Mr RAJENDRAKUMAR, Ellappan (India)

Session Classification: Poster: P7

Track Classification: FTP - Fusion Technology and Power Plant Design