

Development and qualification of ceramic breeder materials for the EU Test Blanket Module: Strategy and R&D achievements

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Europe has developed two reference tritium Breeder Blankets concepts that will be tested in ITER under the form of Test Blanket Modules (TBMs): i) the Helium-Cooled Lithium-Lead (HCLL) which uses the liquid Pb-16Li as both breeder and neutron multiplier, ii) the Helium-Cooled Pebble-Bed (HCPB) with lithiated ceramic pebbles as breeder and beryllium pebbles as neutron multiplier. Both concepts are using the EUROFER reduced activation ferritic-martensitic (RAFM) steel as structural material and pressurized Helium technology for heat extraction (8 MPa, 300-500°C).

The paper reviews the current status of development and qualification of the EU TBMs functional materials; namely ceramic solid breeder materials (Li-orthosilicate and Li-metatitanate). The main functional requirements are listed with the selection/acceptance criteria. The EU development and qualification strategy is presented. Also, the current status of the R&D activities with the main achievements is overviewed.

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