## **OVERVIEW OF IRRADIATION CAMPAIGNS IN THE HFR ON CERAMIC BREEDER CANDIDATES**

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For the European Helium cooled Test Blanket Module (TBM) in ITER, functional materials are required which have low tritium inventory and high mechanical stability. Radiation resistance and preservation of these properties at DEMO relevant conditions is of paramount importance. In this respect an overview will be given on the irradiation campaigns carried out in HFR Petten in the period of 1985-2010.

The irradiation experiments contained different types of lithium ceramics ( $Li_xMO_y$ , M= Al, Zr, Ti, Si). These materials have been obtained using different production routes, resulting in a variety of microstructural properties regarding porosity and grain sizes. In addition different <sup>6</sup>Li enrichments have been used. These ceramics have been tested in irradiation campaigns like EXOTIC and PBA with the objective to study the in-pile tritium release behaviour under various conditions, post irradiation microstructure evaluation, thermo mechanical behaviour of pebble beds and chemical interaction with Eurofer.

This paper presents the material matrix including the tests performed on the irradiated ceramics. The tritium release results of each type of ceramic will be compared regarding microstructural properties, resulting from the different production routes. The results on thermomechanical behaviour of pebble beds will be compared and evaluated towards DEMO requirements. Recommendations for post irradiation experiments on HICU and future experiments will be given.