

## FUSION TECHNOLOGY ACTIVITIES AT JET: LATEST RESULTS

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In the year 2000, the JET Task Force Fusion Technology (TF-FT) was launched to use the unique capabilities, facilities and operating experience at JET to provide significant contributions to the research programme on both JET and ITER. In this respect TF-FT has focused on the following main topics: Tritium in the Tokamak, Material transport and erosion/deposition, In situ techniques for detritiation and deposit characterization /removal, Neutronics and Waste Management, Engineering and Test Beds. This paper presents the most recent results obtained within the JET TF- FT programme.

Tritium retention has been further investigated analysing the poloidal distribution of tritium trapped in a carbon divertor floor tile measured with a coring and combustion technique that revealed high surface but much smaller bulk tritium concentrations, whilst AMS (Accelerator Mass Spectrometry) showed non-uniform poloidal distributions in the inner and outer divertor wall tile.

Material transport and erosion/deposition have been studied extensively within the various TF-FT work-programmes by analysing tiles removed during every JET shutdown, providing a general map of the erosion/deposition inside the vessel and indicating the main mechanisms of transport. Most recently, the combination of Ion Beam Analyses(IBA) and Secondary Ion Mass Spectroscopy(SIMS) techniques has been used to analyse the divertor, wall and dump plate tiles removed during the 2007 shutdown.

Concerning the in situ techniques for detritiation and characterisation/removal, there has been intensive development of laser techniques. Laser Induced Breakdown Spectroscopy (LIBS) has provided very encouraging results on the composition of deposited films on PFC's and their removal rate. Significant results have been achieved on quantitative characteristics of layer adhesion with the lock-in laser thermography method. Because of its great importance for the temperature control of the new metallic wall, the calibration process of the Be surface temperature measurement (independently of emissivity and reflected flux) with active infrared thermography by a laser pulsed method will be presented.

JET fusion technology also contributes to the global strategy of the operator for complying with the safety agency requirements for tritium management. The related items are: a) the semi-industrial scale process of purification of tritiated water needed upstream of the water detritiation process, b) the development of a housekeeping waste detritiation method and c) the development of the <sup>3</sup>He method as a potential non-intrusive and non-destructive method for the determination of the tritium concentration in waste drums.

Finally, this paper will also present the activities in preparation for the ITER Like Wall programme mainly focused on the characterization of marker tiles before installation in the wall and divertor and on the refurbishment of diagnostics dedicated to deposition characterization (Quartz micro-balance and rotating collectors).

<sup>#</sup> See the Appendix of F. Romanelli et al., *Proceedings of the 22nd IAEA Fusion Energy Conference 2008, Geneva, Switzerland*