

## MEASUREMENT AND ANALYSIS OF ACTIVATION INDUCED IN LANTHANUM, ERBIUM AND TANTALUM BY FUSION PEAK NEUTRONS (P4-I-305)

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The large fluxes of neutrons in the materials of a fusion device during operation produce activation that is relevant to operational safety and decommissioning. Nuclides with a broad range of half-lives have to be included in the corresponding analyses. The activity with decay times ranging from the order of magnitude of minutes to weeks is of interest with respect to heat production and shut-down dose rates, whereas the long-term activity determines the waste management. The activity is mainly produced by two components of the neutron flux spectrum, by thermal neutrons and by the 14-MeV D-T fusion neutrons. Analyses of the material activation rely on calculations with inventory codes and libraries containing activation and decay data. To gain trust in the results of such calculations data and codes have to be validated experimentally.

In the present work, the European Activation System (EASY, inventory code FISPACT and data library EAF) was tested in benchmark experiments on Lanthanum, Erbium and Tantalum. They are constituents of fusion reactor structural materials such as EUROFER and insulating coatings for liquid breeder systems.

Small samples of the materials were irradiated in a D-T neutron field. The gamma-radioactivity following irradiation was measured several times during decay and nuclide activities were derived. For each of the measured activities the corresponding value was calculated with EASY, and the calculated-to-experimental ratios (C/E) were determined. The nuclear reactions producing the activities were also analysed.

The C/E ratios obtained for the individual activities will be used for discussing the activation performance and the contact dose rate of the materials at fusion power plant conditions.