MAFF Status Report

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At the through-going beam tube SR-6 of the FRM-II high flux reactor, the Munich Accelerator for Fission Fragments will be installed. A comprehensive overview of the MAFF project is given e. g. in [1,2].

The zircaloy-4 reactor beam tube has been successfully installed and leak tested in October 2000. Shortly afterwards, the shielding plugs have been put in place. Thus, all in-pile parts of MAFF that can be installed without formal approval of the project by the reactor safety authorities (StMLU, TÜV) are in place and the beam tube unit SR-6 is ready for reactor start-up.

The approval procedure of MAFF will start officially after the final authorization for nuclear operation of the FRM-II has been obtained; the latter is expected for mid 2001.

A crucial part of MAFF is the combined target/ion source unit that will be placed in the center of the SR-6, i. e. at a distance of 60 cm from the fuel element, in a neutron flux of $\approx 1.6 \cdot 10^{14}\,\mathrm{cm}^{-2}\mathrm{s}^{-1}$ and will be operated at a temperature of up to 2400° C.

Therefore, tests have been started concerning the doping of porous graphite with UC_2, i. e. the preparation of the MAFF target. They were successful in the sense that the required UC_2 concentration could be achieved, and also the distribution of uranium carbide in graphite seems to be sufficiently homogeneous, nevertheless we are expecting better results with an improved technique. These tests are described in detail in [3]. Further tests are going to investigate chemical reactions between rhenium (the target container material) and graphite or UC_2, respectively, at high temperatures. If necessary, a vitreous carbon inlet may be used to protect the container from UC_2.

Furthermore, a test beam tube is being set up in hall 3 of the MLL. It represents the in-pile part of the SR-6 and allows to operate a prototype of the target/ion source unit in real geometry but in an environment that is easily accessible and equipped with diagnostic devices. During test operation, the attention will be focussed on the mechanical stability of the set-up, temperature distribution, ion-optical characteristics of the source and the efficiency of the cryo-pumping for different gas species. Besides normal operating conditions, also failure scenarios will be investigated. A detailed description of these tests is given in [4].

References

[1] D. Habs *et al.* (eds.), *MAFF — Physics Case and Technical Description,* Oct. 1998,
`http://www.ha.physik.uni-muenchen.de/maff/`

[2] D. Habs *et al.*, *The Munich Accelerator for Fission Fragments MAFF, the Recycling of Radioactive Beams and Superheavy Elements,* in J. H. Hamilton *et al.* (eds.), Proc. 2nd Int. Conf. on Fission and Properties of Neutron-Rich Nuclei, St. Andrews, Scotland, World Scientific, Singapore (2000), pp. 406–413

[3] H.-J. Maier *et al.*, this report, p.76

[4] P. G. Thirolf *et al.*, this report, p.75

Fig. 1: Fitting of the zircaloy beam tube into the FRM-II.