



Preface

Since several years Accelerator Driven Systems (ADS) have been studied in several countries as a promising option for Radioactive Waste Management in the frame of a Partitioning and Transmutation strategy. The objective is to reduce drastically the burden on a deep geological repository in terms of heat load, potential source of radiotoxicity and waste volumes. The ADS concept offers the potential benefit to transmute TRU-loaded fuel in an effective and safe manner.

Most ADS concepts studied in Europe are based on the use of heavy liquid metals (HLM) both as spallation target to provide the external neutron source, and as coolant for the sub-critical core.

There are significant scientific and technological challenges when using HLM in nuclear applications:

- Compatibility of structural materials with HLM
- Corrosion effects and protection layers development
- Liquid metal physical-chemistry, oxygen and impurities control and monitoring
- Instrumentation development
- Potential degradation of mechanical properties in presence of HLM
- Combined effects on materials of particle irradiation and HLM
- HLM thermal-hydraulics

These issues are actively explored in several laboratories worldwide. In Europe this field of research is particularly relevant: national and international experimental programs are underway at several dedicated installations. Moreover a major experiment, the MEGAPIE 1 MW liquid Pb–Bi spallation target, to be irradiated in the SINQ facility at PSI-Switzerland, is in an advanced stage of realisation.

The 3rd International Workshop on Materials for Hybrid Reactors and Related Technologies, held in Rome, 13–15 October 2003 has gathered about 80 scientists, and 27 presentations were made on the most recent R&D results relevant to the issues mentioned above. Significant progress has been documented, and still open issues have been identified with proposals for future R&D. Presentations, technical exchanges and discussions, especially with experts from the Russian Federation, have been of a very high scientific level.

Most of the contributions presented to this workshop were prepared in the frame of the EC 5th Framework programme 'TECLA' project.

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