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Editorial Note

These proceedings provide papers that were presented at the Symposium N 'Nuclear Materials' of the EMRS Spring meeting 05, held from May 31 to June 2, 2005 at the Palais des Congrés in Strasbourg. The Symposium concerned materials that are applied in the nuclear environment and that are studied for their specific utilisation under demanding temperature, pressure and irradiation environments. Most of these materials act as barrier and their structural properties are investigated with emphasis on mechanical performances, reliability and long-term behaviour.

The welcome was addressed by Abdelilah Slaoui, vice-president of the EMRS and the introduction was given by Claude Degueldre following the scheme presented in the first paper of these proceedings.

The first session was chaired by Nadine Baluc (EPFL) and Dominique Hittner (Framatome ANP) and concerned ten papers dealing with component materials for advanced fission and fusion systems where the temperature as well as the energy and the flux of particles are very high. This session connected research activities on structural materials for fusion devices with R&D for high temperature gas reactors.

The second session on structural materials for thermal reactors was chaired by Peter Rudling (ANT) and Margaret McGrath (OECD-HRP) included eight papers on structural materials such as cladding, assembly components, reactor internals and vessel or piping in light or heavy water reactors.

The third session was chair by Didier Hass (ITU) and Claude Degueldre (PSI) and concerned nine papers dealing with fuel materials including advanced oxides, nitrides, carbides or metals in homogeneous form or as composites such as cercer or cermet that can be used either as fuel or as a target for transmutation.

The fourth session about waste forms was chaired by Bernhard Kienzler (INE, FZK) and Virginia Oversby (VOM Konsult, Stockholm) and dealt with ten papers. The waste form materials must be recognised for their durability and their low solubility or leaching rate in environmental conditions over geological time scales.

The poster session briefing was given by Christine Guéneau (CEA) and Alvin Solomon (University Purdue) and covered the thirty posters presenting studies connected to the four sessions topics.

The symposium dealt with materials ranging from structural components of fission and fusion systems, fuels and waste forms, applying, however, independently for these materials computer codes such as TRIM or MD simulation or experimental tools with for example AFM or XAFS. Macro-properties such as thermodynamical, thermophysical and mechanical as well as microstructural analysis of these materials were discussed for example by comparing properties prior and after irradiation. In most cases, irradiations with accelerators guide the investigator in choosing the optimal components.

The Symposium also hosted the 10th workshop on inert matrix fuel, which was scheduled separatively in the Symposium.

The members of the Scientific Committee: Tim Abram (BNFL), Harald Bolt (Max-Planck-Institut), Chaitanyamoy Ganguly (IAEA), Wolfgang Hoffelner (PSI), Jaap van der Laan (NRG), Gerard Lander (ITU), Clement Lemaignan (CEA), Bruno Riccardi (ENEA), Timo Saario (VTT), Eric Simoni (Université Paris Sud), Minh Quang Tran (EPFL), Lars Werne (SKB) and Wolfgang Wiesenack (OECD-HRP) are acknowledged for their participation in accounting and guiding the symposium organisers. The symposium was sponsored by the IAEA cooperation programme and by PSI.

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The EMRS student award of Symposium N was given to Nicola Cachia from CEA France and University of Montpellier for his work on 'Solubility improvement of cerium and plutonium by reduction in borosilicate glasses' using X-ray absorption spectroscopy to characterise the redox species in the material. The IMF award was offered to Christoph Pistner from the University of Darmstadt for his work 'Neutronic calculations on the impact of burnable poisons to safety and non-proliferation aspects of inert matrix fuel'.

The participants of the Symposium are thanked for the constructive discussions that emerged at the end of each session. They focussed on the challenges of the nuclear research with reliable, inert or low-activation materials improving the safety and the sustainability of the nuclear systems.

The Symposium Organisers

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