

**EUROMAT 2017/ Symposia Structure/Area D**

<b>D.9</b>	<b>Title: Qualification and modelling of structural and fuel materials for sustainable nuclear reactors.</b>		
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<b>Summary</b>			
<p>This symposium intends to host papers addressing recent advances concerning the understanding of the physical processes leading to structural and fuel material ageing and degradation in the conditions envisaged for Generation IV reactors, using advanced models and/or microstructural characterization, to help in the qualification of these materials and in the elaboration of design rules. Nuclear materials topics or relevance for GenII/III reactors or fusion will be considered, as well, especially if they are of interest also for Gen IV reactors.</p> <p><b>Scope:</b> Sustainable nuclear energy systems, also denoted as Generation IV reactors, along with the necessary fuel recycling facilities, allow the nuclear fuel cycle to be closed and the energy output from available resources to be substantially increased, while improving the management of high level radioactive waste through transmutation processes. These systems are therefore potentially able to provide energy for many centuries to come. However, the operating conditions envisaged for these systems are demanding and will impact on the performance of structural and fuel materials: the safety and the feasibility of most of these nuclear system concepts and their optimization will depend crucially on the capability of the chosen materials to withstand the operating conditions expected. Materials capable of withstanding extreme conditions like high temperature, prolonged irradiation, and chemically aggressive environments, must therefore be selected or developed, properly qualified, and their behaviour in operation fully understood. Some of these conditions are common to both current nuclear systems and fusion, as well as non-nuclear high energy efficiency systems. The ambition of this symposium is to link physical understanding and subsequent model development, based on in-depth experimental characterisation and advanced modelling, with the elaboration of rules for the design of GenIV reactor systems, in order respond to the expectations in terms of safety and efficiency of future nuclear reactors, with focus on fast reactors but ranging from advanced light water reactors to fusion.</p> <p><b>Targeted topics:</b></p> <ul style="list-style-type: none"> <li>✓ Degradation mechanisms under irradiation, due to high temperature or in connection with exposure to aggressive coolants in steels (austenitic, ferritic/martensitic, ...) and other metallic alloys, structural ceramics (SiC<sub>i</sub>/SiC, ...) and fuels (MOX, minor-actinide containing materials, ...): models and experiments</li> </ul>			

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|  | <ul style="list-style-type: none"><li>✓ Use of models and data to elaborate design rules for structural materials or to improve the reliability of fuel performance codes</li><li>✓ Advances in the qualification of materials for the conditions expected in future nuclear reactors</li></ul> |
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