

EUROMAT 2019 / Area D

SYMPOSIUM: D7

Title: Qualification, development and modelling of structural and fuel materials for sustainable nuclear reactors		
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Abstract		
<p>This symposium will host papers addressing recent advances concerning the understanding of the physical processes leading to structural and fuel materials ageing and degradation in the conditions envisaged for Generation IV reactors, using advanced models and/or microstructural characterization, in support of the qualification of current materials and development of new ones. Nuclear materials topics of relevance for GenII/III reactors or fusion may be considered, as well.</p> <p><u>Scope:</u> Sustainable (Generation IV) nuclear energy systems 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. Materials capable of withstanding extreme conditions, like high temperatures, prolonged irradiation, and chemically aggressive environments, are crucial for the realization of GenIV systems and 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 show how physical understanding and subsequent model development, based on in-depth experimental characterisation and advanced modelling, can support and enable the design of GenIV systems that will respond to the expectations in terms of safety and efficiency.</p> <p><u>Targeted topics:</u></p> <ul style="list-style-type: none">• Degradation mechanisms under irradiation, due to high temperature or in connection with exposure to aggressive coolants in steels and other metallic alloys, structural ceramics and fuels: models and experiments.• Use of models and data in support of design or development of innovative structural and fuel materials solutions.• Advances in the manufacturing, processing and qualification of structural and fuel materials for the conditions expected in future nuclear reactors.		