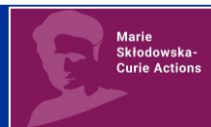




## Open PhD Position in European Industrial Doctoral Network (DN-ID)



[www.cesaref.eu](http://www.cesaref.eu)

### Concerted European action on Sustainable Applications of REfractories (CESAREF)

#### What is CESAREF and what is the focus of this network?

CESAREF will train researchers in multi-engineering areas and expose them to the academic and non-academic sectors through international and inter-sectoral mobility combined with an innovation-oriented mind-set. They will get the right combination of research-related and transferable competences in the **full production-to-the-end-of-life cycle of refractory materials applied to Iron & Steelmaking processes** with regards to the new operation conditions requested by the drastic reduction of greenhouse gas emissions, improved energy efficiency, and by life cycle assessment requirements. An important part of the project will be dedicated to the sustainability of refractories, including recycling issues, using the **Life Cycle Assessment** methodology. **15 doctoral candidates** will take advantage of the most sophisticated numerical tools and laboratory equipment to model, design and predict the life of refractory materials in critical operational conditions. Being trained in scientific, technical, and soft skills, these PhDs are the next generation of highly employable scientists and engineers in the refractory sector and related areas. New testing methods and models will be developed to address the Scientific/Technological challenges for these applications and help to design better performing and sustainable refractory materials and linings. The research training is implemented through strong relationships between 10 academia and 16 industrial partners across the EU. The CESAREF network ([www.cesaref.eu](http://www.cesaref.eu)) is structured to take full advantage of intensive cooperation between **academia, raw material suppliers, refractory suppliers and high-tech metal component producers** with a direct link to the **FIRE federation** ([fire-refractory.org](http://fire-refractory.org)).

#### Specific subject of PhD9 (one of 15 PhD's of the CESAREF DN-ID project)

### PhD9 Topic: Influence of microstructure of refractory materials on the macroscopic mechanical behavior

**Objectives:** Materials selected from the partner institutions will be characterised with mechanical testing including Young's modulus determination with the impulse excitation technique, creep under compression and Mode I wedge splitting testing. Creep samples with various achieved creep strains will be forwarded to BAM to investigate changes in the microstructure and pore size as well as pore size distribution during creep. Finally, conclusions on the macroscopic behaviour will be drawn with the help of large-scale facilities and X-CT as well as some other complementary investigations.

**Expected Results:** Influence of pore size distribution and pore size volume on the creep and fracture behaviour; Influence of different raw materials and processing routes on the creep and fracture behaviour, development of pore size distribution during creep testing.

**Keywords:** spinel, mullite, fused silica based refractories, pore size distribution, thermomechanical properties, creep, fracture

**Applicant Profile:** **Master's level in Materials Science, Materials Engineering.** Candidates should be excellent in their skills for experimental work, knowledge of material physics and refractories is preferred, oral and written communication skills in English are a prerequisite. Experience in sample preparation is appreciated.

#### PhD main locations:

Period 1 - SAFRAN ([www.safran-group.com](http://www.safran-group.com)), Colombes, France (18 months)

Period 2 - MUL ([www.unileoben.ac.at](http://www.unileoben.ac.at)), Leoben, Austria (18 months)

Due to the Mobility Rule by the funding agency, residents of France cannot apply for this PhD9 position

Apply until June 27<sup>th</sup> following indications at [www.cesaref.eu/recruitment-procedure](http://www.cesaref.eu/recruitment-procedure)

If you have any questions, feel free to contact the supervisors:

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