



At the Faculty of Mechanical, Process and Energy Engineering, Institute of Ceramics, Refractories and Composite Materials an open position of a



Research Associate (m/f/d) – reference number 113-E/2022

within the DFG Research Training Group “Refractory Recycling: A contribution for raw material-, energy- and climate-efficiency in high temperature processes”, PhD project P1 „Environmentally friendly binders for Al₂O₃-C and MgO-C materials based on refractory recyclates with particular thermomechanical, chemical and anti-clogging properties“

is available.

Pay grade: according to German pay grade E13 TV-L
Hours: 1,0 FTE (part-time possible)
Contract type: fixed-term for 48 months

The focus of the Research Training Group 2802 is an interdisciplinary education of PhD students in order to be able to acquire the abilities to explore the material property spectrum as well as the limitations of a new generation of high-temperature materials on the basis of refractory recyclates with specific thermo-mechanical, chemical and functional properties in high-temperature processing in the metallurgy, and to develop new ideas accompanied by new scientific fields. Thereby a material oriented CO₂-reduction shall be achieved via refractory material recycling. The aim of this PhD project is to develop a new generation of carbon bonded refractory materials “Green Refractories” based on Al₂O₃-C and MgO-C recyclates and environmentally friendly binders (gelatine, tannin, lactose etc.). The microstructure modification according to a high thermal shock resistance will be pursued by nanoscale and semiconducting additives (to achieve a high residual carbon content after pyrolysis) and/or by recycled carbon fibre structures (acting as crack deflexion spots/points). In a special steel melting simulator, the thermal shock resistance and chemical interactions between the green refractories and molten steel will be investigated. Significant inclusion populations within the solidified steel will be analysed by means of AFA (Automatic Feature Analysis) in a P-REM. By dint of the simultaneous casting of steel melt through a reference nozzle and a nozzle made from green refractories, wetting and particularly clogging phenomena can be evaluated.

Job description:

- working on a multidisciplinary scientific topic in the field of recycling of refractory materials
- planning and performing experiments associated with the development of sustainable refractory materials as well as their testing and microstructure characterization
- analysis of experimental data, interpretation of results
- discussion of results within an interdisciplinary research team
- writing of reports
- writing and submitting of scientific publications in peer-reviewed journals
- presentation of research results at national and international conferences

What you can expect from us:

- working at a family-friendly university with flexible working hours
- a wide range of networking, mentoring and development opportunities
- a focused research programme and a structured training strategy
- attractive fringe benefits, e.g. Asset-based benefits (VL), company pension schemes (VBL), health management, “Job-Ticket”

What we expect from you:

- university diploma or master’s degree in Materials Science, Materials Engineering or related disciplines
- outstanding theoretical knowledge and practical skills in processing and characterisation of refractory materials
- an aptitude for experimental research work
- good team-working and communication skills
- advanced German and English skills
- readiness and ability to complete a PhD thesis

A three-stage, weighted process is used to select the best suited and highly motivated PhD candidates. For more information, see: <https://tu-freiberg.de/forschung/grk2802/stellenangebote>

For further information please contact Prof. Dr. Christos G. Aneziris (phone: +49-3731 39-2505, e-mail: aneziris@ikfvw.tu-freiberg.de).

The applicant (m/f/d) must meet the hiring requirements for fixed-term employment contracts according to the WissZeitVG. Applicants with disabilities will receive preferential consideration, provided they possess equal qualifications. For consideration, we ask you to submit proof of your disabled status together with your application documents. TU Bergakademie is committed to increasing the number of women in teaching and research positions, hence qualified female candidates are especially encouraged to apply.

Written applications, including a CV, motivation letter and copies of all relevant qualifications documents (certificates, diplomas) and a summary of the thesis, should be submitted by **June 7th, 2022** stating **reference number (113-E/2022)** to the following address:

TU Bergakademie Freiberg, Dezernat für Personalangelegenheiten, 09596 Freiberg or e-mail: bewerbungen@tu-freiberg.de

Your application documents will not be returned, please only submit copies. TU Bergakademie Freiberg is always looking for scientific personnel from various disciplines. Further information can be found at <http://tu-freiberg.de/wirtschaft/karriere/stellenausschreibungen>