



At the Faculty of Materials Science and Materials Technology, Institute of Iron and Steel Technology, an open position of a



Research Associate (m/f/d) – reference number 126-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 P5 „Investigation of the effect of MgO-C products based on recyclates and environmentally friendly binders on the sulphidic purity of the steel and spinel formation“ 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. The PhD students should acquire the abilities to explore the spectrum of materials properties as well as the limitations of a new generation of high-temperature materials based on 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 the doctoral project P5 is to research the interaction of a low-sulphur-containing manganese-boron steel MBW1500 and a highly basic desulfurization slag with MgO-C products based on recyclates and environmentally friendly binders. In order to determine the influence of thermophysical properties on the interaction with new refractories, the viscosity, surface tension and density of the liquid MBW1500 aluminum killed steel in undesulfurized and desulfurized states and the slags with high sulfur capacity are determined as a function of [S], (SiO₂), (MgO), (S), and temperature. The refractory samples for further analysis of the interactions using light microscopy and SEM are obtained by finger testing an MgO-C product in the steel and slag melt. The (S)/[S] distribution between the MBW1500 steel and the slag is studied in a crucible of MgO-C products based on the recyclates in the MFG-40. The inclusion population of the steel samples after the examination in the MFG-40 is interpreted by a chemical analysis or analyzed with optical examination methods such as light microscopy combined with AFA (Automatic Feature Analysis) in P-SEM. The spinel formation between recycled FF material and liquid steel is specifically studied in a confocal laser scanning microscope.

Job description:

- working on a multidisciplinary scientific topic in the field of interaction of low sulfur manganese boron steel MBW1500, ladle slags with MgO-C products based on recyclates
- readiness and ability to complete a PhD thesis
- planning and performing experiments
- analysis of the experimental data, interpretation of results
- discussion of results within an interdisciplinary research team
- writing of project reports
- writing and submitting of scientific publications in peer-reviewed journals
- presentation of research results at national and international scientific conferences

What you can expect from us:

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

What we expect from you:

- university diploma or master's degree in Materials Technology, Steelmaking or related disciplines
- outstanding theoretical knowledge and practical skills in processing and characterisation of steels and slags
- 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:

GRK 2802 website: <https://tu-freiberg.de/forschung/grk2802/stellenangebote>

**For further information please contact Prof. Dr. Olena Volkova
(phone: +49-3731 39-3100, e-mail: volkova@iest.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 30th, 2022** stating **reference number (126-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>