At the TU Bergakademie Freiberg, Faculty of Materials Science and Materials Technology, Institute of Materials Science, an open position of a

Research Associate (m/f/d) – reference number 278-E/2023

within the DFG Research Training Group “Refractory Recycling: A contribution for raw material-, energy- and climate-efficiency in high temperature processes”, cohort II, PhD project P8 “Microstructure design of composite materials using FAST/SPS” is available from July 1st, 2024.

Pay grade: according to German pay grade E13 TV-L
Hours: 1,0 FTE (40 hours/week; part-time possible)
Contract type: fixed-term for 48 months (until June 30th, 2028)

The focus of the Research Training Group 2802 is an interdisciplinary education of the 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 aims of the PhD project P8, cohort II, are to

− Explore the capabilities of the spark plasma sintering (SPS) technique for synthesis of ferrites with spinel-type crystal structure and composites containing spinel-type ferrite and graphite
− Describe the relationship between the parameters of the SPS process, the microstructure of the SPS samples and their functional properties

This subproject should contribute substantially to the understanding of phase reaction and microstructure formation processes during the SPS synthesis. Concurrently, it should explore the possibilities of the SPS technology for targeted microstructure design of composite materials made from refractory recyclates.

Job description:
− Work on a multidisciplinary scientific topic in the field of synthesis of refractory materials from recyclates
− Planning and performing experiments associated with the production of refractory composite materials in a SPS process
− Analysis of the microstructure of the SPS samples incl. the crystal structures of present phases using diffraction techniques (XRD, EBSD/SEM, SAED/TEM), electron microscopy (SEM, TEM) and X-ray spectroscopy (EPMA); formulation of the structure and microstructure models
− Characterization of selected functional properties of the synthesized composites
− Cooperation and discussion of results within an interdisciplinary research team
− Writing of project reports
− Presentation of research results at national and international scientific conferences
− Writing and submitting of scientific publications in peer-reviewed journals

What you can expect from us:
− Employment at a family-friendly university with flexible working hours
− Remuneration according to the provisions of the collective agreement for the public service of the German federal states in accordance with the personal requirements
− Attractive fringe benefits, e.g., asset-based benefits (VL), company pension schemes (VBL), health management, ‘Job Ticket’ for public transportation
− A wide range of networking, mentoring and development opportunities
− Supervision through experienced staff members; advanced professional training
− Focused research programme and a structured training strategy
What we expect from you:
- University diploma or master’s degree in Materials Science, Physics, Mineralogy, Chemistry or related disciplines
- Outstanding theoretical knowledge and practical skills in the fields of the structure and microstructure analytics and the characterization of physical properties of solids
- An aptitude for experimental research work
- Good team-working and communication skills
- Excellent German and/or English skills
- Readiness and ability to complete a PhD thesis

For selecting the best suited and highly motivated PhD candidates a three-stage weighted procedure will be applied:

**Stage I.** Submitted written application documents (weighting: letter of motivation 10%, final grade 50%, relevance of the master’s or diploma thesis 40%)

**Stage II.** Online interview via the conferencing system BigBlueButton (weighting: motivation 30%, professional skills 50%, language skills 20%)

**Stage III.** Oral presentation at the TU Bergakademie Freiberg (weighting: 10-minute oral presentation on the given topic: 50%, discussion 50%).

For further information please contact Prof. Dr. David Rafaja (phone: +49-3731 39-2299, e-mail: rafaja@iww.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) as well as and a summary of the thesis, should be submitted by March 15th, 2024 stating reference number (278-E/2023) 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](http://tu-freiberg.de).