Helmholtz-Zentrum Dresden-Rossendorf e.V.

With cutting-edge research in the fields of ENERGY, HEALTH and MATTER, around 1,500 employees from more than 70 nations at Helmholtz-Zentrum Dresden-Rossendorf (HZDR) are committed to mastering the great challenges facing society today. The Institute of Resource Ecology conducts applied basic research to protect humans and the environment from the effects of pollutants resulting from technical processes of energy and raw material extraction. An important goal is a better understanding of fundamental processes that influence the transport and the accumulation of radiotoxic elements in the geo- and biosphere including the food chain. This also includes research on microbial activity in potential repositories for highly radioactive waste. The departments Radiation Research on Biological Systems and Surface Processes are looking for a

PhD Student (f/m/d) for experimental research on the impact of microbial activity on the immobilisation of plutonium in the nearfield of a nuclear waste disposal subject to pending project approval.

The long-term safety of a deep geological repository of high-level radioactive waste requires a detailed understanding of the interactions of radionuclides and geotechnical barriers. Carbonate minerals such as siderite ($FeCO_3$) play a central role in clay formations and as secondary phases on corroded waste containers. Iron-reducing bacteria can also form this mineral. Plutonium, one of the most relevant transuranium elements, has a complex redox chemistry. Especially the interaction of Pu(III) and Pu(IV) with carbonate minerals and the influence of microbial activity on retention processes are still poorly understood. The PhD thesis is part of the joint project TRANSFER, which is jointly funded by the Federal Ministry for Research, Technology and Space (BMFTR) and the Federal Company for Radioactive Waste Disposal (BGE). The consortium brings together five Helmholtz Centres and five universities, and is coordinated by the GFZ German Research Centre for Geosciences. This joint research project is organized as an interdisciplinary graduate school, combining individual supervision with intensive collaboration across institutions. The structured qualification program comprises seminars, summer and winter schools, conference participation, and research stays at partner institutions.

City: Dresden; Starting date (earliest): 01/03/26; Remuneration: TVöD-Bund; Reference number: 2025/152; Closing date: 07/12/25

Working field

- Cultivation of anaerobic bacteria and production of biogenic minerals
- Investigation of the sorption of Pu(III)/Pu(IV) on biogenic minerals
- Studying ternary systems consisting of the three components Pu(III/IV), bacteria and biogenic minerals
- Characterisation of the molecular environment of plutonium in solution and on solid phases using spectroscopic (e.g. UV-vis, Raman, X-ray absorption spectroscopy) and microscopic (e.g. electron microscopy) techniques

- Conducting literature review, writing scientific publications, and presenting research results
- Mentoring student courses

Requirements

- Very good university degree (Master) in Natural Sciences, preferably in the fields of Chemistry, Biology, Earth Sciences or related field
- Experience in experimental laboratory work, high motivation and initiative
- Willingness to work with open radioactive materials in a radiation-controlled laboratory is required
- Knowledge of handling radioactive materials and radiochemical methods is an advantage
- Excellent knowledge of a broad range of microbiological, chemical and analytical methods are an advantage
- Ability to communicate and carry out work in an interdisciplinary research team (radiochemistry, biochemistry, geochemistry, physical chemistry) and willingness to participate in scientific conferences and workshops
- Excellent written and verbal communication skills in English

What we offer

- A vibrant research community in an open, diverse and international work environment
- Scientific excellence and extensive professional networking opportunities
- A structured PhD program with a comprehensive range of continuing education and networking opportunities - more information about the PhD program at the HZDR can be found here
- Salary and social benefits in accordance with the collective agreement for the public sector (TVöD-Bund) including 30 days of paid holiday leave, company pension scheme (VBL)
- We support a good work-life balance with the possibility of part-time employment, mobile working and flexible working hours
- Numerous company health management offerings
- Employee discounts with well-known providers via the platform Corporate Benefits
- An employer subsidy for the "Deutschland-Ticket Jobticket"

Application

We kindly ask you to send us your application documents (including cover letter, CV, diplomas/transcripts, contact details of two references, e.g. former superiors) until 7 December 2025, which you can submit via our online-application-system: https://www.hzdr.de/db/Cms?pNid=490&pOid=75910&pContLang=en

As part of the application process, your application documents and personal data will be forwarded to the GFZ coordination. By submitting your application, you consent to this transfer.