Job Information

Project: MaGnesium Alloys for effICient solId stAte cooliNg (MGICIAN)
Funding Provider: European Union, Horizon Europe - Marie Sklodowska-Curie Actions Doctoral Networks (Grant Agreement No. 101227508)
Host Institution: Leibniz Institute for Solid State and Materials Research (IFW); Dresden, Germany
Main Supervisor: Prof. Dr. Kornelius Nielsch (IFW Dresden), Germany
Co-Supervisors: Prof. Dr. David Astrain, (UPNA) Spain, Dr. Hao Yin, (TEGN) Denmark
Duration: 36 months (full-time employment)
PhD-awarding Institution: Technische Universität Dresden

Offer Description

Doctoral Candidate (DC) 9 – *Fabrication of High-Performance Thermoelectric Modules for Solid-State Cooling*

About the Host Institution

The Leibniz Institute for Solid State and Materials Research Dresden (IFW Dresden) is a non-university research institute conducting fundamental and applied research in advanced functional materials for sustainable technologies. The institute employs approximately 500 staff members from more than 40 countries and offers a highly international and interdisciplinary research environment. Further information is available at https://www.ifw-dresden.de.

About the MGICIAN Doctoral Network

MGICIAN is a Horizon Europe MSCA Doctoral Network dedicated to developing sustainable magnesium-based thermoelectric materials and translating them into high-performance solid-state cooling technologies. The network brings together academic and industrial partners across Europe and trains **15 Doctoral Candidates (m/f/div)** in materials development, interface engineering, module fabrication, and system integration.

Project Overview

DC9 focuses on the fabrication, optimization, and validation of high-performance thermoelectric modules for solid-state cooling applications. Building on magnesium-based materials and advanced interface concepts developed within the consortium, DC9 will develop thermoelectric modules with optimized cooling performance and high durability. The project will involve the fabrication of modules, the simulation of thermoelectric devices and the testing of these devices under realistic operating conditions.

Research Tasks and Training Objectives

The Doctoral Candidate (m/f/div) will:

- Develop thermoelectric module architectures based on Mg-based materials
- Characterize and evaluate electrical, thermal, and mechanical module performance under steady-state and cyclic conditions
- Optimize module design through variation of geometry, processing parameters, and contacting strategies, supported by finite element simulations.
- Collaborate within the European MGICIAN network and disseminate research results through publications and conferences
- Participate in intersectoral secondments and structured doctoral training activities

Secondments

To strengthen interdisciplinary and intersectoral training, DC9 will complete secondments at:

- **TEGnology (Denmark) –** 2 months
  Focus: Industrial module assembly and fabrication optimization
- **University College Cork (Ireland)** – 3 months
  Focus: Integration of advanced interface and joining concepts for module prototypes
- **Public University of Navarra (UPNA, Spain)** – 2 months
  Focus: Advanced device testing and heat exchangers

Requirements

Education

Master's degree (or equivalent) in Mechanical Engineering, Materials Science and Engineering, or a closely related field. Applicants must be eligible to enrol in a PhD programme at **Technische Universität Dresden**.

Technical Competences

- Strong background in thermoelectric devices or materials processing
- Experience with device characterization or the performance testing of materials
- Understanding of electrical and thermal transport in thermoelectric systems
- Familiarity with numerical simulations or simulation tools is advantageous

Personal Skills

- Strong analytical and experimental problem-solving abilities
- Ability to work independently and within an international and interdisciplinary research network
- Excellent written and spoken English

Documents Required

- Copies of Bachelor's and Master's diplomas and transcripts (with certified translations if applicable)
- Candidates may apply before obtaining their Master's degree by submitting a provisional certificate; however, employment cannot commence before the degree is formally awarded

Further details are provided in the online application system.

MSCA Doctoral Candidate Eligibility Criteria

- Must not hold a PhD degree
- Comply with the MSCA mobility rule (not resided or carried out their main activity in **Germany** for more than 12 months in the 36 months before recruitment)

Additional Information

Employment Conditions

- Full-time employment contract for up to 36 months
- Salary according to the MSCA Doctoral Network regulations, including:
  - Living allowance: €4,058/month
  - Mobility allowance: €710/month
  - Family allowance: €660/month (if applicable)

The final gross and net salary will depend on the national taxation and social security contributions

- Enrolment in a PhD Programme at *Technische Universität Dresden in the department of Mechanical Engineering*
- Participation in international training events and secondments

Equal Opportunities

IFW Dresden and MGICIAN are committed to equal opportunities and diversity in line with the European Charter for Researchers. We encourage qualified women to apply to increase female representation. Additionally, disabled applicants (m/f/div) will receive preferential consideration if they meet the requisite qualifications. Promising candidates will be invited for an online interview.

Where to Apply

Applications must be submitted exclusively through the official project website https://mgician.eu.
Applications submitted by email will not be considered.
Applicants should prepare:

- Curriculum Vitae (CV)
- Motivation letter
- Copies of academic transcripts and certificates

Contact

For information about this research project and the Doctoral Candidate position, please contact:
Prof. Dr. Kornelius Nielsch (k.nielsch@ifw-dresden.de)
For questions regarding the administrative aspects of the recruitment process, please contact:
Dr. Jamil Ur Rahman (info@mgician.eu)
Additional information about the host institution and the research group can be found at https://mgician.eu/