

PhD position at the University of Duisburg-Essen, Institute for Combustion and Gasdynamik



Offen im Denken

Universität Duisburg-Essen Duisburg

Your Tasks:

Participation within the DFG (German Research Community)-Research Project "Functionalized Si/SiN_x Nanoparticles as Anodes for High-Performance Lithium-Ion Batteries: Gas-phase Synthesis, Structural and Electrochemical Investigation". The overall goal of this project is to investigate the formation of Si/SiN_x composite nanoparticles by scalable gas-phase synthesis and to study their electrochemical properties as anode material for lithium-ion batteries (LIBs). This includes a detailed investigation and understanding of the correlation between synthesis conditions and materials characteristics as well as between materials characteristics and electrochemical performance. The PhD candidate is expected to carry out independent research work to fulfil the project tasks. This project will be conducted in collaboration with the Argonne National Laboratory, Chicago, USA (ANL). Therefore, the candidate is expected to travel to ANL to conduct own experiments and analysis at ANL.

Detailed job description:

- Plan and perform experiments to synthesize Si and Si/SiN_x nanoparticles and nanocomposites
- Characterization of the prepared materials, e.g. XRD, SEM, TEM, EDX, XPS, Raman, FTIR, BET
- Analysis of the experimental results and optimizing the synthesis parameters
- Maintaining the hot-wall reactor
- Post-processing of Si/SiN_x nanoparticles with well-defined characteristics for LiBs
- Study the electrochemical performance (e.g. capacity, Coulombic efficiency, cycling stability and rate-capability) of Si/SiN_x based anodes, and investigation of the correlation between materials' properties and battery performance
- Analysis of the structure and composition evolution of the Si/SiN_x anodes during the electrochemical cycling, e.g. using the *in situ* synchrotron XRD (together with ANL)
- Publishing the research work in leading peer-reviewed journals
- Presenting the project results at international conferences

The listed research tasks will enable the applicant to prepare a dissertation for obtaining the degree of a PhD. The participation for preparing and conducting teaching sessions is anticipated.

Your Qualifications:

- Master's degree (or equivalent level) in chemistry, physics, materials science or engineering.
- Experience in at least one of the following research areas:
 - battery assembling, testing and data analysis
 - nanoparticles synthesis, characterization and data analysis

- Good English skill in both written and oral forms
- Ability to carry out independent research work; however, active participation and collaboration in our multidisciplinary research group is highly desired

Availability of Position: as soon as possible

Duration of Contract: 3 years

Salary: 13 TV-L, full time

Application Deadline: 08 31th 2017

For more information please visit:

https://www.uni-due.de/ivg/rf/home_chair_ivg.php

Please send applications with reference code 408-17 electronically to lisong.xiao@uni-due.de. Please note that applications cannot be returned.

The University Duisburg-Essen aims at promoting the diversity of its members (see <http://www.uni-due.de/diversity/international.shtml>). Applications from disabled or equivalents according to § 2 Abs. 3 SGB IX are encouraged.

Kontakt für Bewerbungen

Dr. Lisong Xiao

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