



The Institute of Micro- and Nanostructure Research (IMN) & Center for Nanoanalysis and Electron Microscopy (CENEM) at the Friedrich-Alexander-Universität (FAU) Erlangen-Nürnberg offer a

PhD position

for

In situ Microscopy & Nanomechanics of Flexible Nanowire Electrodes

Flexible transparent electrodes have seen an increasing demand in applications ranging from flexible organic solar cells and light emitting diodes to touch panels and smart clothing. The electrode must withstand mechanical loading without sacrificing electrical and optical performance. Nanowire networks are highly promising candidates, as they combine mechanical flexibility with low sheet resistance and high optical transmittance. Moreover, such nanowire electrodes can be fabricated by low-cost solution processes. At IMN (www.em.tf.fau.de) we investigate the fundamental deformation and failure modes of individual nanowires as well as nanowire electrodes by combining *in situ* and *ex situ* mechanical testing in light microscopy, SEM and TEM. We directly correlate mechanical and electrical performance of nanowire networks to identify detrimental failure modes and to develop coating strategies for enhanced flexibility. The *in situ* microscopy studies are carried out within the framework of the Research Training Group GRK 1896 “*In situ* microscopy with electrons, X-rays and scanning probes” (www.grk1896.fau.de). Our collaboration partners in the GRK 1896 provide outstanding expertises in atomistic simulations and organic solar cells, which enable us to gain insight into the fundamental defect mechanisms on the one hand and to relate our microscopic studies to applications on the other hand.

In order to advance our understanding of flexible nanowire electrodes and their mechanical/electrical performance, we are seeking a highly motivated PhD student for advanced *in situ* micro- and nanomechanical studies. The applicants should have a master's degree in materials science, physics chemistry, or a related discipline. Applicants with a background in either electron microscopy or nano- and micromechanics are particularly encouraged to apply.

The IMN, a research institute of the Materials Science Department, explores the advanced capabilities of CENEM (www.cenem.fau.de), a well-established microscopy center and user facility at the FAU Erlangen-Nürnberg. The CENEM hosts a number of state-of-the-art electron microscopes, among these a double-corrected monochromated (S)TEM Titan Themis³ 60-300, a probe-corrected (S)TEM Spectra 200 and a FIB-SEM Helios Nanolab 660. For micro- and nanomechanical testing advanced *in situ* capabilities are available, including a Hysitron PI95 Picoindenter with push-to-pull device, mechanical straining holders for TEM as well as custom-made straining stages for tensile and fatigue testing in light microscopy and SEM.

We offer working in a great team and expanding electron microscopy group within a vibrant scientific environment. Scientific discussion, the process of creating own ideas and the possibility to implement them are key elements of our research philosophy.

The salary is according to German standard (75% E13 TV-L). **The position will be filled as soon as possible.**

The FAU Erlangen-Nürnberg is interested in increasing the share of women in research and teaching positions and therefore explicitly encourages female candidates to apply.

Physically disabled applicants receive favorable consideration when equally qualified.

Please send your application until 15. Mai 2021 by e-mail to Prof. Erdmann Spiecker (Erdmann.Spiecker@fau.de) and Dr. Johannes Will (Johannes.Will@fau.de).