

***In situ* transmission electron microscopy studies of one-dimensional materials** — •VADIM MIGUNOV¹, ZI-AN LI², SPASOVA MARINA², MICHAEL FARLE², and RAFAL E. DUNIN-BORKOWSKI¹ — ¹Ernst Ruska-Centre for Microscopy and Spectroscopy with Electrons and Peter Gruenberg Institute, Research Centre Juelich, Juelich, Germany — ²Faculty of Physics and CeNIDE, University of Duisburg-Essen, Duisburg, Germany

As a result of recent progress in *in situ* transmission electron microscopy (TEM), the mechanical, electronic and magnetic properties of nanoscale materials and devices can now be investigated directly and correlated with their local three-dimensional morphologies, atomic structures and chemical compositions.

We have studied the mechanical, electronic and field emission properties of a variety of different nanostructures, including InAs nanowires and CdS nanocomb-like structures, using methods based on scanning probe microscopy (SPM) *in situ* in the TEM. In particular, we have used a combination of SPM and off-axis electron holography in the TEM to measure electrostatic potential and charge density distributions inside and outside materials with nm precision, both in projection and in three dimensions. Such information about local functional properties is important both for fundamental research and for the design of novel nanoscale devices.

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