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Nanoscopic Investigations of Low Dimensional NanoMaterials via TEM

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Extended Abstract

Detailed structural and chemical composition analyses of nanomaterials at the atomic scale are essential for understanding their impact on material properties. Transmission Electron Microscopy (TEM), particularly spatially resolved Electron Energy Loss Spectroscopy (SR-EELS) in an aberration-corrected TEM, is the most powerful technique for obtaining this information. With access to an electron probe approaching 1 angstrom, the atomic configuration of these nanomaterials can be precisely determined [1-10].

In this presentation, I will showcase a selection of recent studies addressing these topics. These studies focus on the atomic structure and configuration of low dimensional nanostructures, including nanotubes and graphene-like materials in both pristine and hybrid forms. Additionally, I will discuss optoelectronic property investigations conducted through EELS measurements [1-10]. These works highlight the exceptional capabilities of Cs probe-corrected (S)TEM combined with a monochromator, enabling high spatial resolution in property analysis. Furthermore, I will present recent in-situ TEM-EELS studies, demonstrating the power of this approach in simultaneously capturing various physical and chemical characteristics crucial for understanding different phenomena.

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