東京大学
微細構造解析
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東京大学微細構造解析プラットフォーム
公開講演会

“Probing structure, properties and dynamics of nanostructures through scanning transmission electron microscopy and first-principles theory”

Dr. S. J. Pennycook

Department of Materials Science and Engineering, University of Tennessee, Knoxville, TN 37996, USA.

The aberration-corrected scanning transmission electron microscope (STEM) now allows direct, real space imaging at atomic resolution with low accelerating voltages to minimize damage. In two-dimensional materials such as graphene and transition metal dichalcogenides, atom-by-atom characterization of atomic position, atomic species, chemical bonding and optical and electronic properties has become feasible. Furthermore, through direct momentum transfer, the STEM probe can also reveal the dynamics of small clusters. Examples will include conformational changes of a Si_6 cluster in a graphene nanopore, and of a sub-2 nm CdSe nanocluster that explains its white light emission. Metallic transition metal chalcogenide nanowires can be formed directly from their respective dichalcogenide monolayer sheets, and are metallic, and self-healing against beam damage. In solar cells, the same combination of atomic level microscopy and theory reveals new directions to improve cell efficiency. Finally, the possibilities of a next generation microscope will be demonstrated, the potential to reveal octahedral distortions with even greater precision, to determine point defect configurations, even to track point defect diffusion inside three-dimensional materials.

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(工学部総合研究機構　9 号館 1 階　大会議室)
Organizer: Prof. Yuichi Ikuhara Phone: 03-5841-7688