Tata Institute of Fundamental Research
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Seminar

Interrogating Functional Nanomaterials at Atomic Scale through Electron Microscopy

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The race to ultimate resolution in electron microscope has enabled routine exploration of nanomaterials at atomic scale, leading to a better understanding in the structure-property relationship. This talk will focus on such state-of-the-art electron microscopy for metal nanowires and electrochromic tungsten oxide.

The first part will deal with structural aspect of ultrathin Au nanowires, wherein using aberration-corrected transmission electron microscopy (AC-TEM) we show that Au atoms in close-packed planes of the nanowire undergo systematic displacement forming saddle surfaces. Next, using quantitative scanning transmission electron microscopy (STEM) in conjunction with atom-counting, we investigate 3-D structure of a similar scale Pt nanowire.

In the second part, I will focus on the synthesis of the phase dependent electrochromic behaviour of tungsten oxide. The strategically synthesized phases, namely hexagonal and orthorhombic WO_3, exhibit very different electrochromic switching, which can be rationalized through computed electronic interactions. Further, I will briefly discuss very recent atomic-scale AC-STEM results suggesting epitaxy-driven temperature dependent phase transformation in WO_3.

Thursday, Nov 29th 2018

4:00 PM (Tea/Coffee at 3:30 PM)

Seminar Hall, TIFR-H