



# Scanning Probe Microscopy for Energy Research: 7 (World Scientific Series in Nanoscience and Nanotechnology)

*Dawn A Bonnell, Sergei V Kalinin*

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Efficiency and life time of solar cells, energy and power density of the batteries, and costs of the fuel cells alike cannot be improved unless the complex electronic, optoelectronic, and ionic mechanisms underpinning operation of these materials and devices are understood on the nanometer level of individual defects. Only by probing these phenomena locally can we hope to link materials structure and functionality, thus opening pathway for predictive modeling and synthesis. While *structures* of these materials are now accessible on length scales from macroscopic to atomic, their *functionality* has remained *Terra Incognitae*. In this volume, we provide a summary of recent advances in scanning probe microscopy studies of local functionality of energy materials and devices ranging from photovoltaics to batteries, fuel cells, and energy harvesting systems. Recently emergent SPM modes and combined SPM-electron microscopy approaches are also discussed. Contributions by internationally renowned leaders in the field describe the frontiers in this important field. **Readership:** Students, professionals and researchers in materials science, nanomaterials and new materials.

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