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Sommario/riassunto

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 h