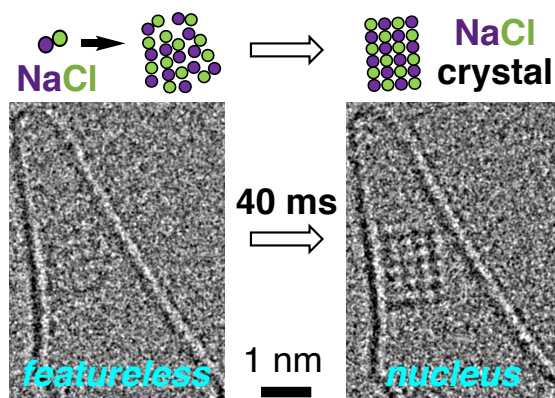


Dynamic molecular electron microscopy: An emerging tool for chemists

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Recent technological innovations in electron microscopy, such as aberration correctors, high-speed imaging cameras, and continuous sample rotation, have ushered in an era in which the behavior of individual molecules can be analyzed. In addition to the visual impact of the images obtained, electron microscopy has become a tool for clarifying the correlation between molecular structure and function, as well as dynamics and function in materials science and biological science. In this lecture, I will report on the new paradigms of molecular electron microscopy opened up by single-molecule atomic-resolution real-time electron microscopy. Examples will include single-molecule thermodynamics and kinetics based on ultra-fast imaging of individual molecules and reaction events, in situ structural and statistical analysis of crystal growth, and the mechanism of organic crystal degradation in electron diffraction that has long confused people. We would like to reach a chemical understanding by answering academic questions that have been obscured so far, such as what we actually see and the essential meaning of what we see in electron microscopy.



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