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Imaging of Pt Nanocrystals on SrTiO₃ Substrate: Coherent X-ray Diffraction and Scanning Microscopy Studies TRAVIS DOUGLAS, JOSHUA GILD, MICHAEL PIERCE, Rochester Institute of Technology, VLADIMIR KOMANICKY, Faculty of Science, Safarik University, ANDI BARBOUR, HOYDOO YOU, Argonne National Laboratory — Imaging of nano-scale structures, particularly those in real-world environments, presents a significant challenge. X-ray Coherent Diffractive Imaging (CDI) provides one avenue of accessing the structural information of a nano-scaled sample in a harsh environment. However, while this problem has been solved for Au and Pb nano-crystals in clean, vacuum environments, much work remains before it can be rapidly employed in other systems. Our efforts center on determining the real-space structure of Pt nanocrystals grown on SrTiO₃ substrates using a combination of CDI and atomic force scanning microscopy (AFM). X-ray speckle patterns have been obtained using coherent diffraction of these crystals which can be transformed back to real space coordinates to calculate the crystal structure using CDI algorithms. Microscopy provides complementary information allowing us to simulate the speckled diffraction patterns from real-space images of the actual particles. This dual approach of using both real and reciprocal space information to solve the structures should lead to a practical set of algorithms and procedures whereupon the samples can be imaged quickly in the environments and conditions of interest.

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