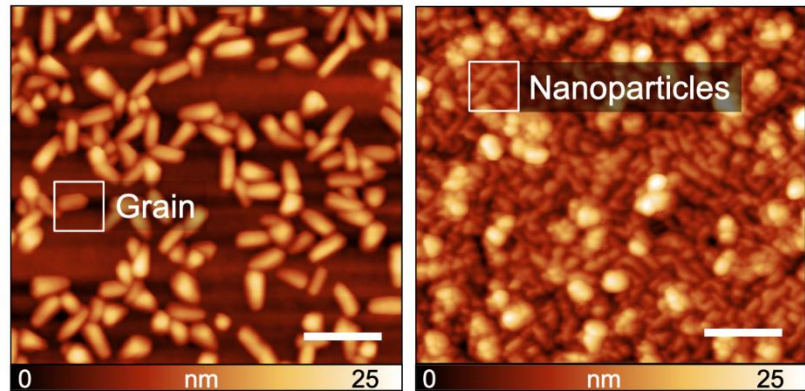
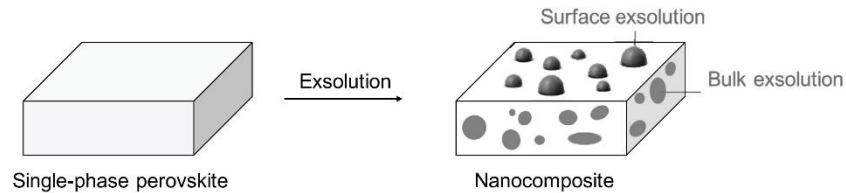


# Tuning Electrochemical & Electronic Properties



The lower panel shows the material changes after the exsolution process depicted in the upper image.

J. Wang, K. Syed, S. Ning, I. Waluyo, A. Hunt, E. J. Crumlin, A. K. Opitz, C. A. Ross, W. J. Bowman, B. Yildiz. *Adv. Funct. Mater.* **32**, 2108005 (2022).

Work was in part performed at Brookhaven National Laboratory and at Lawrence Berkeley National Laboratory

National Synchrotron Light Source II

## Scientific Achievement

Scientists demonstrated that exsolution, a fabrication process, can be used to create metal oxide nanocomposites with tunable chemical, magnetic, and electrical properties.

## Significance and Impact

This study shows a new way for scalable fabrication of nanocomposites with special electrochemical and electronic features desired in novel memory or processor devices or clean energy technologies.

## Research Details

- Found that exsolution changed the conductive properties of the material by two orders of magnitude.
- Showed that this change arises from iron-deficient channels.
- Discovered how to tune the magnetic properties during exsolution through temperature.
- Used the IOS beamline at NSLS-II & beamline 9.3.2 at ALS