

## Importance of Nanostructure in Ferroelectric Devices

Along the way to develop lead-free dielectric materials, it was discovered that nanoparticles of Barium Titanate performed three times better than macroscopic materials in supercapacitors. This spiked a flurry of interest to discover how the material worked. Here we show that the answer to this question lies in the microstrain defined by the classical Williamson-Hall analysis of neutron or X-ray powder diffraction data. A much more detailed understanding comes from Bragg coherent X-ray diffraction imaging that reveals the structural details of the microstrain in individual nanoparticles. This talk will explain how X-ray coherence is used for imaging and how this could be a routine addition to a powder diffraction instrument.

Structural investigation of the metastability of barium titanate nanoparticles grown under hydrothermal conditions, Ana F. Suzana, Sizhan Liu, Jiecheng Diao, Longlong Wu, Tadesse A. Assefa, Ross Harder, Wonsuk Cha, and Ian K. Robinson, Nanotechnology (2021)

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