From Lead Zirconate to PZT: Evolution of Structure

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Reading Room
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The oxide solid solutions Pb(Zr,Ti)O$_3$ have been the backbone of actuators and sensors for the past half century, because they are strong piezoelectrics, interconverting voltages and shape changes. The alloying of Ti with Zr provides strong polar character as well as disorder, making the dipoles ultraresponsive to external pressure, temperature and electric fields. We use X-ray diffraction and inelastic X-ray scattering to explore structural changes as well as dynamical motions of atoms underlying piezoelectric response. By studying a family of Pb(Zr,Ti)O$_3$ solutions with different Ti:Zr ratios at different temperatures, new insights is discovered about the physics underlying this important family of smart materials.

Hosted by Andrew Rappe (rappe@sas.upenn.edu)