

Crystal Chemical Rules Are Made To Be Broken: Naughty Perovskites

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Through numerous seminal publications Takeshi Egami has unraveled the complexities of materials systems ranging from metallic glasses, high T_c superconductors, relaxor ferroelectrics to complex liquids. By developing new methodologies to reveal their local structures his work has had a profound impact in understanding the previously hidden complexity and material physics of these and many other systems.

This talk will discuss some of our earlier studies on the influence of B-site order on the local structure and properties of PMN-related relaxor ferroelectrics where Takeshi's insights were invaluable. In those systems the B-site correlations are critical in mediating the local polarization. The talk will also discuss frustrations induced through the ordering of cations in mixed A-site perovskites. In particular complex nanoscale modulations that accompany the layered ordering of alkali and rare earth cations in the so-called "nano-checkerboard" titanate and tungstate perovskites will be described.