

-- A new avenue to improve functionality of materials and to design unprecedented properties --

Research groups led by Profs. Yuichi Ikuhara and Alexander L. Shluger at the WPI-AIMR (Advanced Institute for Materials Research), Tohoku University, have first observed an unexpected superstructure arising from an interaction between impurities and defects segregated at grain boundaries in magnesium oxide (MgO), by combining an aberration-corrected scanning transmission electron microscopy equipped with atomic-resolved electron energy-loss spectroscopy with the theoretical calculations. This observation represents a significant step forward in the revolution of our view on the role played by atomic/electronic structures of grain boundaries on the nature of ubiquitous polycrystalline materials such as mechanical strength and electric/ionic conductivity.

The research result has been published online in *Nature* on November 16, 2011. The paper is entitled “Atom-resolved imaging of ordered defect superstructures at individual grain boundaries”.

For more information: [Click here](#).