東京大学大学院工学系研究科　総合研究機構

結晶界面工学研究室

Crystal Interface Laboratory, The University of Tokyo

Crystal Interface Lab. Seminar Series

“Dislocation Networks in Oxides: A means for mechanical self-doping”

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Dislocations in oxides are typically heavily charged and embedded in a shell of compensating space charges. In the literature dislocations have been demonstrated to enhance oxygen conductivity and improve the figure of merit of thermoelectrics by reducing thermal conductivity through phonon scattering by dislocations. Dislocations have been suggested to improve interfacial reaction kinetics and have been theoretically predicted to pin domain walls in ferroelectrics. The plasticity of oxides has recently been demonstrated to be related to charge carriers.

In Darmstadt we have so far focused on establishing a set of techniques to introduce a high density of bulk dislocations into single crystals at room temperature or enhanced temperature and to study (dislocation) creep in polycrystalline oxides. Structural investigations have been performed by dark-field X-ray diffraction, rocking curve analysis, TEM, PFM, NMR, EPR and etching techniques. The first property evaluations have been done with respect to electrical and thermal conductivity and domain wall pinning.

Select examples will be provided on dislocation structures, electrical and thermal conductivity. We have been working on $SrTiO_3$, $BaTiO_3$, $KNbO_3$, TiO_2 and ZrO_2.

Main meeting room at Institute of Engineering Innovation

工学部総合研究機構９号館１階　大会議室

2019, March 28th (Thu)　15:00～16:30