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

Crystal Interface Lab. Seminar Series

Institute of Engineering Innovation
The University of Tokyo

Interfacial Reconstruction and Formation of 2D Electron-Gas at Oxide Interfaces

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Abstract

High mobility conduction at the interface of two dissimilar materials and the ability to manipulate the carrier density and mobility of the interfacial charge by electrostatic gating have lead to many fascinating phenomena in the past decade. In this presentation I will give an overview of our recent work on interfacial reconstruction and formation of two-dimensional electron-gas in strongly-correlated multilayer oxides investigated by means of high-resolution electron microscopy, electron energy-loss spectroscopy, electron holography, and DC electrical transport measurements. Focus will be on the interfacial electronic structure and charge transfer that are related atomic scale oxygen-hole depletion, valence-state variation, chemical diffusion, and interfacial strain. Examples include $SrTiO_3$/RO/$SrTiO_3$ (R=La, Pr, Nd, Sm, Y) and $(LaMnO_3)_{2n}/(SrMnO_3)_n$ superlattices as well as Heusler alloy (Co_2MnSi and Co_2FeSi)-$SrTiO_3$ interfaces and $YBa_2Cu_3O_{7-x}$-$Pr_{0.68}Ca_{0.32}MnO_3$ interfaces. The impact of interfacial charge transfer on competing ferroelectric and ferromagnetic order, metal-insulator transition, superconductivity and other magnetoelectric properties will be discussed.

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Main meeting room at Institute of Engineering Innovation, UT

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