

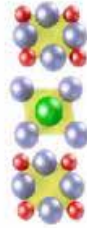
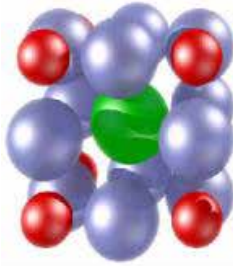
新領域物質系専攻

Lippmaa研究室



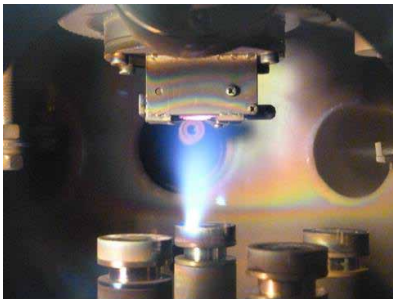
Prof. Mikk Lippmaa

The most common minerals in the Earth's crust are oxides. Oxides can be found everywhere in our everyday life: in concrete, window glass, precious gems, ceramic kitchen knives, and many other places. Oxides are key components in modern electronics as dielectrics in capacitors or insulators in transistors and memories. Lippmaa laboratory works on oxide thin films, nanostructures, and interfaces.

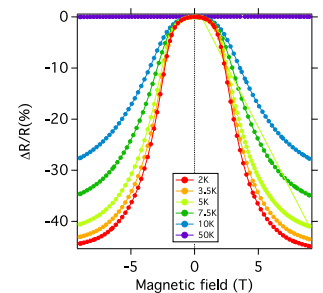
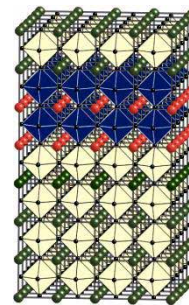
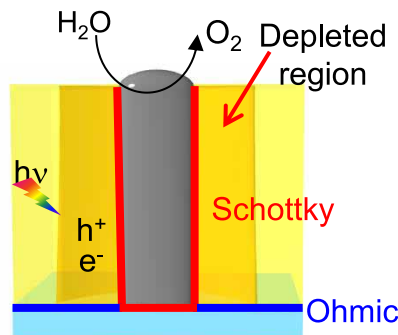
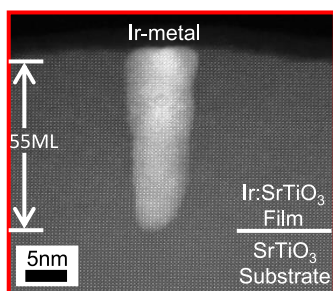


Many common transition metal oxides can be viewed as stacks of atomic layers. This layering and the semi-localized nature of transition metal electrons gives oxides many fascinating properties, such as superconductivity, magnetism, ferroelectricity, and many others.

Working on oxide thin films gives you a chance to learn many experimental techniques, from materials synthesis and nanostructure growth to device fabrication and materials property analysis. We offer projects oriented either at synthesis, property analysis, or technique development, depending on your interests.



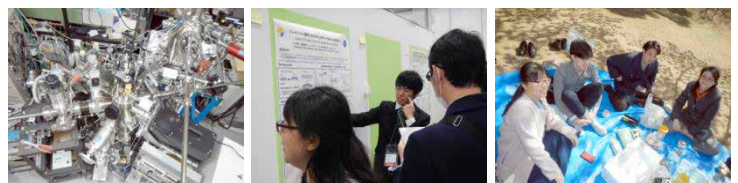
Lippmaa laboratory uses pulsed laser deposition to grow nanoscale films, heterostructures, and various types of nanostructures. Using in-situ electron diffraction, we grow crystals a single atomic layer at a time. Our main interest is in the physical properties of nanometer scale surface layers (catalysis), interfaces (2-dimensional systems), and nanostructures (functional properties). Novel physical properties and functions often appear at interfaces; hence we work on techniques for growing high-quality oxide heterostructures and seek interesting new materials functions.



Photoelectrochemical splitting of water at the tip of an Iridium metal nanopillar in an oxide semiconductor

Searching for novel magnetic states in 2D confined carrier systems at interfaces

We welcome students who like experimental science, are interested in developing new materials and are interested in learning to use various experimental techniques for thin film synthesis and materials characterization.



— 研究室見学はいつでも歓迎です —
E-mail: mlippmaa@issp.u-tokyo.ac.jp
Tel: 04-7136-3315
場所: 物性研 A棟 A313/314

詳しくは研究室HPをご覧ください。
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