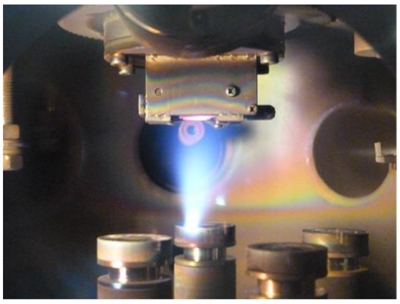
見学コースB（ナノ）

Oxide heterostructures, surfaces, and nanostructures

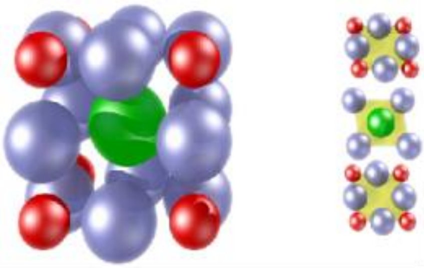
新領域
物質系専攻

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 also key components in modern electronics as dielectrics in capacitors, and insulators in transistors or memories. In recent years, oxides are also used as functional materials in oxide electronic devices.
Lippmaa laboratory works on oxide thin films and nanostructures.

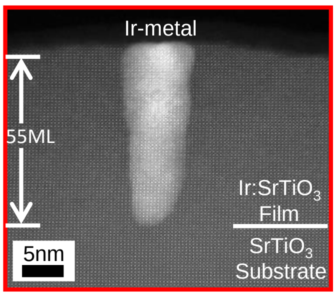


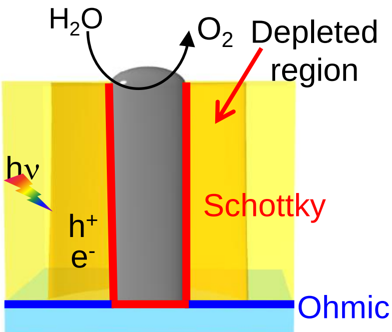
Many common transition metal oxides can be viewed as stacks of atomic layers. This layering and the semi-localized nature of transition metal electrons gives oxide many fascinating properties, such as superconductivity, magnetism, ferroelectricity, and many others.

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.

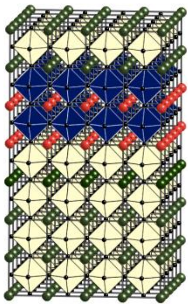
Lippmaa laboratory uses pulsed laser deposition to grow nanoscale films, heterostructures, and various types of nanostructures. Using in-situ electron diffraction, we grow crystals a single atomic layer at a time. Our main interest is in the physical properties of nanometer scale surface layers (catalysis), 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.

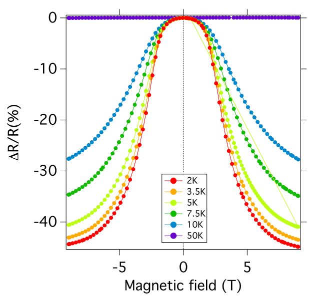
Photoelectrochemical splitting of water at the tip of an Iridium metal nanopillar in an oxide semiconductor

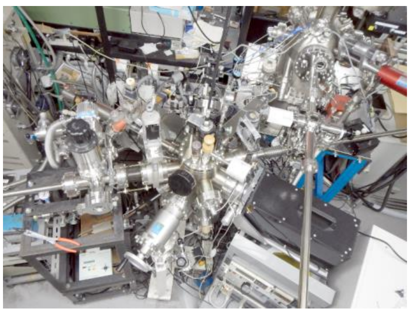


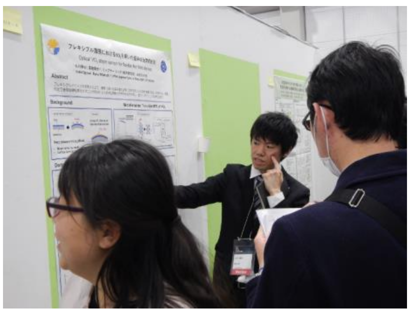


Searching for novel magnetic states in 2D confined carrier systems at interfaces









We welcome students who
・Like experimental science
・Interested in developing new materials
・Willing to learn many new techniques

Lab visits are welcome
https://lippmaa.issp.u-tokyo.ac.jp/
mlippmaa@issp.u-tokyo.ac.jp
Lab: ISSP main building A313/314