



Mizoguchi Research Group

~Understanding role of atom and electron in material~

Institute of Industrial Science, Dept. Mater. Envi. Science

Nano-Materials Design Lab.

<http://www.edge.iis.u-tokyo.ac.jp>

Materials Design ~Paving the way for Materials Design~

What's kind of Structures?

How to bring about the Properties

Property ↔ **Structure**
Relationships



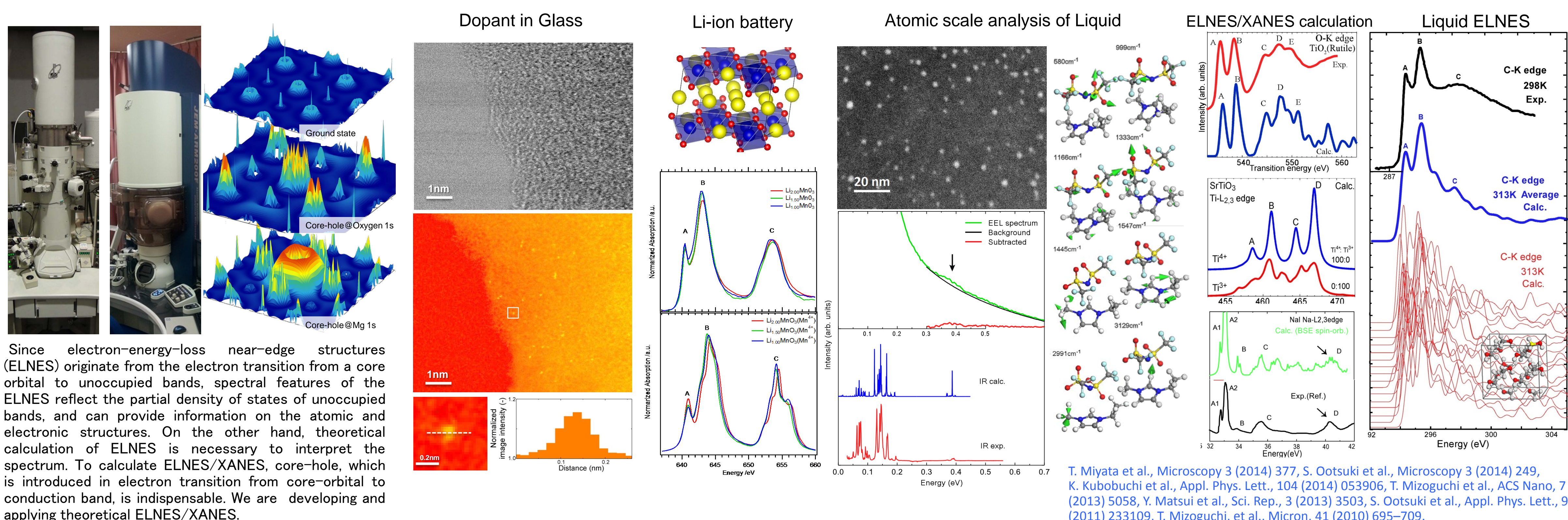
Research in Mizoguchi Research Group

Much higher performance and higher reliability are now required to the materials to achieve further technology developments. In case of electroceramics, such as multi-layer ceramic capacitor and varistor, the size their grains in electric devices becomes smaller and smaller, ca. 1mm or less, and thus further property improvements of each grain and grain boundary are desired. To achieve this, clarification of atomic and electronic structures and finding the way to improve their properties are indispensable.

In our group, atomic and electronic structure analysis of materials are investigating by combining electron energy loss spectroscopy (EELS), transmission electron microscopy (TEM), and first principles calculation. By combining those methods, atomic and electronic structures and their relationships to materials properties can be unraveled.

Particularly, superlattice, ionic liquid, Li-ion battery, Photovoltaic cell and electroceramics are investigated.

Atomic scale investigation using "The Ultimate Analysis"



Materials Design using Lattice Imperfection Informatics

Understanding vacancy formation and dynamics

Interface in Photovoltaic cell

Heterointerface in superlattice

Prediction of interface energy and structure with an aid of information science

