H. INOUE LAB.

Novel Luminescence Glass

Department of Materials and Environmental Science

Amorphous Materials Design
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Create a new glass that luminesces

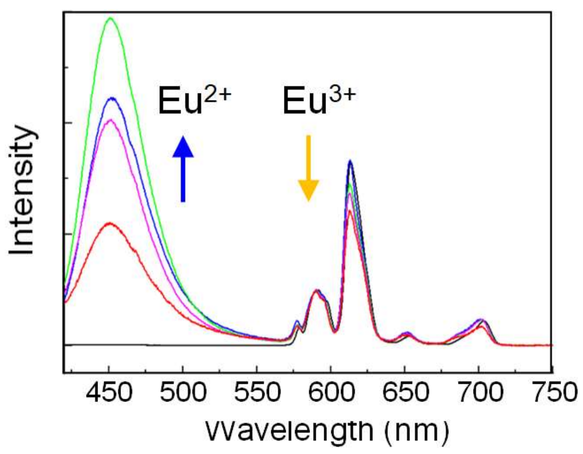
We study the materials from an amorphous state to a liquid state. Atomic and electronic structures of the amorphous and liquid states have not been well understood. We study the method in order to understand these materials, and apply it to a variety of materials. Moreover we will produce novel materials and their applications. Here, the aim is to fabricate new glass, or fabricate crystallized glass by heat-treating the glass, to produce novel luminescence of glass.

◊ New luminescence by crystallization

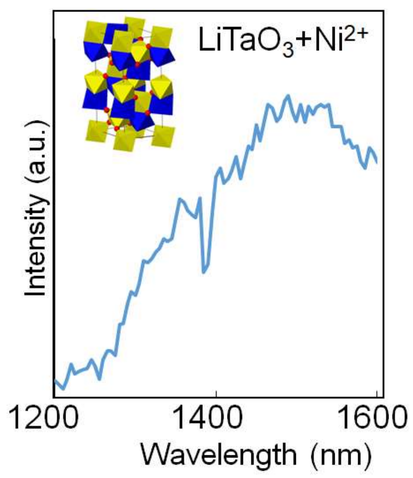
- Reduction of ions by crystallization

$2SrO \cdot 3B_2O_3$（1%Eu_2O_3）

$Eu^{3+} \longrightarrow Eu^{2+}$



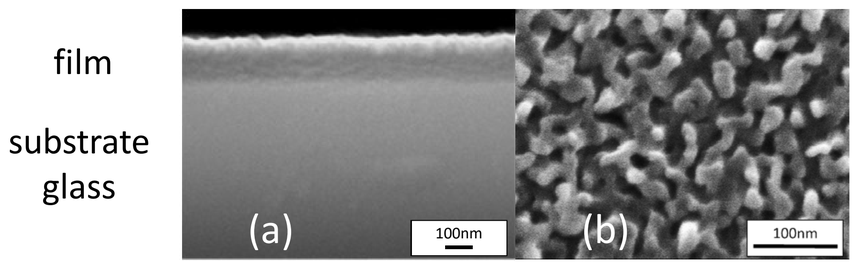
- Ni^{2+} doped infrared emitting transparent crystallized glass



◊ Functional Glass by New Surface Treatment

- Ultra-Low reflectance, Super hydrophilic surface

Reflection image of glass before (left) and after (right) surface treatment



SEM image (a) cross section (b) surface

◊ Glasses prepared by gas levitation furnace and their structure

- **High Refractive Index & Low Dispersion Glass**
- **High Elastic Modulus Glass**
- **High Strength Glass**

Structure Analyses of glasses

- X-ray Diffraction with Synchrotron Radiation
- Solid-State NMR Spectroscopy
- Atomistic Structural & modeling

Gas Levitation Funace