

INOUE LAB.

[New glass formation by containerless processing]

Department of Materials and Environmental Science

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

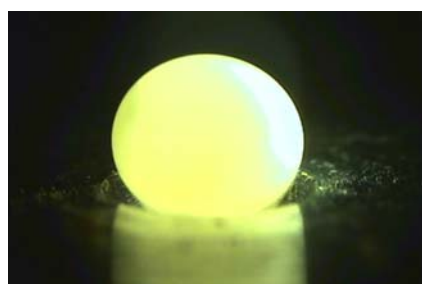
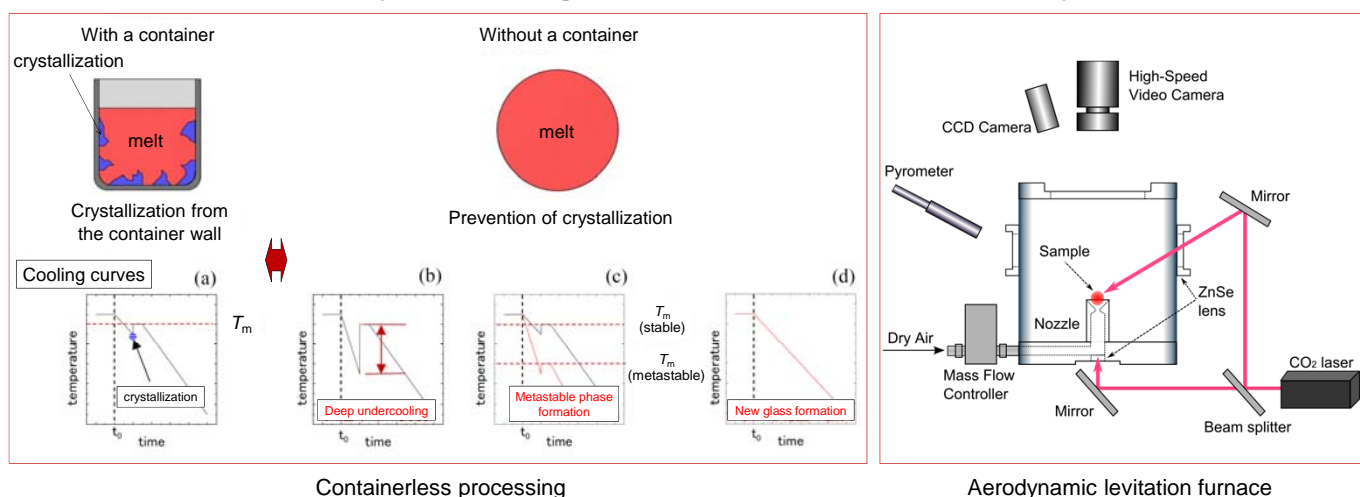
Amorphous Materials Design

Department of Materials Engineering

Metastable Functional Oxides Solidified from Undercooled Melts

Melts could be deeply undercooled by containerless processing. The undercooled melts are thermodynamically non-equilibria and thus new glasses and new metastable materials can be solidified from the melts. Our purpose of research is to prepare new metastable functional oxides and to investigate their physical properties such as thermal stability, optical transmittance, refractive index, luminescence properties, dielectric properties, proton conductivity, hydrogen diffusion, and magnetic properties. Furthermore, through structural analyses including local structure simulation, new guideline for metastable functional materials design will be developed.

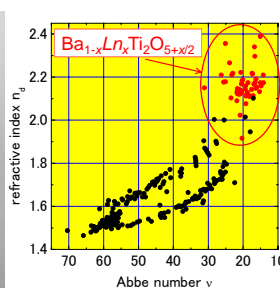
- ◆ New glasses and new metastable materials prepared by containerless processing
- ◆ Thermal, optical, electrical properties of the glass and the metastable materials
- ◆ Local structure analysis of the glass based on the molecular dynamics simulation



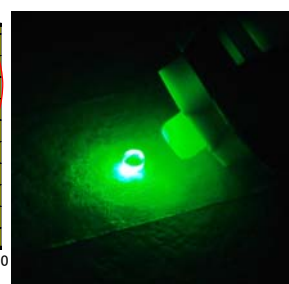
Levitated melt ($\sim 2000^\circ\text{C}$)



Rare-earth doped functional glasses



High refractive index glasses



Luminescence from titanate glass