

Contact person: Conf.dr. Raluca Ciceo Lucacel (raluca.lucacel@phys.ubbcluj.ro)

The laboratory *offers* Bachelor, Master and Doctoral students the opportunity to gain skills in the field of non-crystalline solids approaching the oxide glass and glass ceramics materials.

**Why:** In the last decade, the glass and glass-ceramics materials have played important roles in several industries such as telecommunications, electronics and medicine. Glass compositions and processing techniques continue to evolve leading to the increasing number of applications. Some of the glass compositions have distinctive properties that make them the most preferred materials for certain applications such as optical fibers, electronic displays, biocompatible implants, dental posterior materials and high-performance composites. Glass beads are also being used in radiation therapy to treat certain kinds of cancer. Another important application is glass substrates for DNA analysis.

**Aim:** The research activities done in this laboratory are being focused on the relationships between the composition, structure, properties, processing and performance of the wide range of glass and glass ceramic materials with the aim of tailoring new compositions to suit specific applications. Therefore, various glass systems, such as silicate-, borate-, borosilicate-, phosphate- and tellurite- containing transitional or noble metals ions were considered for synthesis and investigation during the years. Fundamental studies on nucleation, crystal growth as well as on the preparation of glass-ceramics are also carried out.

Since the glass and glass-ceramics materials cover around 35% of the world consumption of *biomaterials*, numerous studies are done on specific bioactive and bioinert compositions.

***Roughly, the laboratory's activities cover:***

- the glass and glass ceramics synthesis using melt quenching method and sol-gel technology,
- the investigation of short-, intermediate- and long- range arrangement of structural elements in the lattice,
- the analyse of surface morphology,
- the investigation of mechanical, optical, electrical and thermal properties.