Laboratory of Analytical Optochemotronics, Kharkiv National University of Radio Electronics, Kharkiv

Technical Area: Biotechnologies, Sensors, Medicine, Material Sciences
Keywords: bionanophotonics, infection diseases diagnostic, nanotechnology sensors, tuberculosis

General Information

Kharkiv National University of Radio Electronics is the only Institution in Ukraine where R&D works on electrogenerated chemiluminescence (ECL) and its applications are conducted. They include development of new analytical ECL technologies and devices for application in biomedicine and ecology. The most promising research area is application of electrochemiluminescent effect in conjunction with advanced high technologies, such as nanotechnologies, and achievements in microelectronics for new biomedical assay methods and corresponding equipment development.

Laboratory Focus

- **ECL sensor** for bioliquids assay for aminoacids detection;
- **automated chemiluminescent ChLC-1 and ECL ELAN-3d complexes** for control of lipids peroxidation, anti-oxidant system activity and anti-infectious therapy control and other analytical applications;
- **nanotechnological ECL sensor instrument** for early definition of active tuberculosis process;
- **microfabrication technology** for novel ECL microfluidic analytical system development with capillary electrophoresis separation of biological molecules;

- **Langmuir-Blodgett technology** (creation of monomolecular layers);
- **atomic force microscopy** (nanostructure level properties investigation, bioobjects nanoindentation etc.);

- **new materials for analytical application (**ordered organics substrate monomolecular thin film technology, diamond-like films et al.).

Valuable Technology Offerings

Development of sensors for analysis of biologically important substances with application of novel achievements in nanotechnology, functionalized materials and microtechnologies. Application of Langmuir-Blodgett technology for creation of nanostructured molecular ensembles for surface modification. Creation of functionalized materials for sensors, working electrodes of electrochemical and ECL cells. creation of principal new method and optical sensor instrument based on spherical semiconductor and electrochemiluminescence for early diagnostics of tuberculosis and other biomedical applications.

Scientific Cooperation and Technology Transfer

We cooperate with the next organizations:
- National Scientific Center “Kharkiv Physical and Technical Institute” of NAS of Ukraine; Institute for Single Crystals of NAS of Ukraine; R. Agladze Institute of Inorganic Chemistry and Electrochemistry of the Georgian Academy of Sciences; J. Heyrovsky Institute of Physical Chemistry and Electrochemistry of the Academy of Sciences of the Czech Republic; Institute of Physical Chemistry of Polish Academy of Sciences, Kharkiv Medical Academy of Postgraduate Education

Technology transfer is accomplished under Science and Technology Center in Ukraine Projects GE-77, 4180, 4495.

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