2016

International projects

- **"Regular Metal Oxide Nanotubes Arrays for Gas Sensing (Gaz-Sens, S-LZ-17-2)"** (2016), funded by Research Council of Lithuania in the framework of Bilateral Lithuania-France programme Gilibert, carried out together with scientists form University of Nantes, Institute of Materials - Jean Rouxel (France) .

Aim of this project is to create nanotube based sensors for detection of toxic gasses. Nanostructures will be patterned in thin metal films employing holographic lithography. Nanotubes will be formed by an oxidation of lithographically formed nanostructures. Patterns will be investigated at KTU Institute of Materials Science and the sensors will be evaluated at the partner laboratories.

National projects

- "Calibration of 3D Acoustic Microscope Visualisation Employing Buried Lithographic Microstructures" (3DSonic) (2016), funded by KTU R&D and Innovation fund

Progress in interdisciplinary branches of science is inseparable from miniaturisation and increasing complexity of the devices and their constituent elements. Verification of these complex, multi-material elements quality, such as integrated circuits, micro-devices, requires development of new non-destructive testing methods. Scanning acoustic microscopy is a very promising method for this particular task where in high-frequency focused ultrasound waves are used for imaging. This method enables investigation of the hidden structures (e.g. lithographically produced contacts, microfluidic device channels networks) but acoustic signal interpretation remains a complex problem. During this project a complex, sample with three-dimensional internal structure pattern was modelled develop and produce, i.e. 3D acoustic calibration block. Different lithography techniques were applied, including ultrashort laser ablation and ultrashort pulse laser modification with subsequent selective chemical etching). Professor K. Baršausko Ultrasound Research Institute has developed an acoustic model and performed simulations of a new required geometry complex three-dimensional objects, they also selected respective material combinations for sample realisation. Samples were realised employing newly mastered lithography technologies. Methods for visualisation of such complex 3D structures were developed and relating the experimental results with the acoustic field modelling results imaging of the hidden structures were performed. Developed imaging method was applied for non-destructive testing visualisation and characterisation of the microfluidic channel geometry and quality.

- **"Adaptation of Novel Diffusion-Driven Organic Field-Effect Transistors for Studying of the Charge Transporting Properties of Ambipolar Semiconductors" (DOFET)** (2016), funded by KTU R&D and Innovation fund

Determination of electrical characteristics of organic semiconductors in real device configuration was performed. During project implementation organic field effect transistor (OFET) structures were designed and constructed. Optimization of the OFET configuration: distance between contacts, contact position in respect with organic semiconductor (top or bottom contact) was performed and mobility of the carriers in the range 10^{-6}–10^{-2} cm^2/Vs was determined. Transmission line measurements of the same structures (without applying gate voltage) were performed and specific resistivity as well as layer resistance were determined.

- **“UV-NIL Technology for the Fabrication of Microlenses on Flexible Polymeric Substrates”** (NILens) (2016), funded by KTU R&D and Innovation fund

The aim of this project was fabrication of micro lens arrays on flexible fluoropolymer substrates by UV-NIL technique.

Self-supporting projects

- “**Quantitative and Qualitative Analysis of Chemical Compounds**” (2016), JSC Rustona, LT

The purpose of the project was investigation of phosphorite powder quantity influence on the structure of serpentinite compound using X-ray diffraction and electron photoemission methods. The optimal amount of phosphorite powder in serpentinite compound was estimated. Recommended parameters for optimisation of technological process were defined.