

2011

International projects

- **“Transnational Network of Public Clean Rooms and Research in Nanotechnology Making Accessible Innovation Resources and Services to SMEs in the Baltic Sea Region” (Technet_nano)** (2011-2014), project of the Baltic Sea Region Programme 2007-2013 <http://www.technet-nano.eu>

The project was carried out together with research institutions from Denmark, Germany, Lithuania, Latvia, Estonia, Poland, Sweden. Project focuses on promoting the innovation potentials of micro and nanotechnology to SMEs and R&D institutions and improving the access to these innovation resources across the Baltic Sea Region. A network was created to unify the organisations which have cleanroom facilities that are operational or under construction within the Baltic sea region. It is planned that this network will provide services for small and medium size enterprises, which need special technological conditions, analytical or technological equipment to ensure successful activity. Most cleanrooms are specialised and adapted for specific technologies, which is why an international network such as this one improves the accessibility of equipment, technological and analytical services for small and medium size enterprises within the region, encourages cooperation and helps spread ideas of micro- and nanotechnology for R&D institutions. It is expected that the project will also strengthen the cooperation of the network partners and initiate common projects. Databases of project partners' competence, equipment, provided technological and analytical services and offered products will increase the visibility and help spread scientific information from high micro- and nanotechnology competence centres within the Baltic sea region.

- **“Nanotechnological Security Marks for the High Value Products” (NANO3)** (2011), project of the IBM Research Centre

The project was carried out in cooperation with IBM.

This project, in cooperation with partners from IBM, was aimed at creating security marks where self-assembly of meso- and nanoscale particles is employed and a technology for fabrication of high resolution structures for this process. During the project, a technology for periodic structure formation employing laser interference lithography was developed and adapted according to the needs of project partners. While selecting optimal parameters for technological processes, diffraction efficiency measurements as well as optical and scanning electron microscopies were employed for qualitative evaluation of the structures. Formed structures were successfully transferred to project partners and applied for further research.

National projects

- **“Nanostructured Diamond-Like Carbon Films for Advanced Optical Metrology Components” (NanoDLC)** (2011-2013), project of high technologies development programme of Agency for Science, Innovation and Technology

The project was carried out together with JSC Precizika Metrology.

The project aimed at the development of the new advanced optical metrological components with prolonged lifetime using diamond like carbon based protective films. During the project, development and implementation of the novel technology of radio frequency plasma enhanced chemical vapour deposition, direct ion beam deposition of nanostructured diamond-like carbon (DLC) films for production

of the advanced photomasks, glass scales and reticles took place. The research included investigation of impact of various float glass and Cr film surface preparation methods on DLC film adhesion to the substrate; influence of DLC film synthesis parameters on their mechanical and optical properties; influence of DLC film chemical composition on their adhesion to the glass and Cr substrate; developing of wear resistant DLC film suitable to protect the scale gratings, photomasks and reticles; analysis of critical parameters of DLC film protected scale gratings, photomasks and reticles (pattern fidelity, edge roughness, edge defects, isolated defects, corner rounding, light transmission). It was expected that improvement of optical metrology components using diamond-like carbon films to protect them against aging will bring new quality and considerable enlargement of market share of the industrial partner.

Publications:

- Tamulevičius, Sigitas; Meškiniš, Šarūnas; Šlapikas, Kęstutis; Vasiliauskas, Andrius; Gudaitis, Rimantas; Andrulėvičius, Mindaugas; Tamulevičienė, Asta; Niaura, Gediminas. Piezoresistive properties of amorphous carbon based nanocomposite thin films deposited by plasma assisted methods // Thin solid films. Lausanne: Elsevier Science. ISSN 0040-6090. 2013, vol. 538, p. 78-84. [Science Citation Index Expanded (Web of Science); Science Direct]. [IF (SCIE): 1,867 (2013)].
- Lazauskas, Algirdas; Grigaliūnas, Viktoras; Guobienė, Asta; Andrulėvičius, Mindaugas; Baltrušaitis, Jonas. Atomic force microscopy and X-ray photoelectron spectroscopy evaluation of adhesion and nanostructure of thin Cr // Thin Solid Films. Lausanne : Elsevier Science. ISSN 0040-6090. 2012, Vol. 520, iss. 19, p. 6328-6333.
- Lazauskas, Algirdas; Grigaliūnas, Viktoras; Meškiniš, Šarūnas; Ecarla, Fanny; Baltrušaitis, Jonas. Surface morphology, cohesive and adhesive properties of amorphous hydrogenated carbon nanocomposite films // Applied Surface Science. Amsterdam: Elsevier. ISSN 0169-4332. 2013, Vol. 276, p. 543-549.