

LABORATORY OF NANOTECHNOLOGY

In addition to the production and investigation of nanostructures, our main profile is the investigation of interfacial phenomena. The contact angle is determined by the sessile drop method, which is an important feature especially during soldering and in the production of water-repellent, self-cleaning coatings. During the synthesis of nanomaterials, we deal with the production and investigation of bulk and surface nanocomposites, heat storage materials, thin films, multilayer structures, metal and ceramic nanoparticles, carbon nanostructures. In addition to synthesis and investigation, the behaviour of nanomaterials and interfaces can also be characterised by physicochemical and thermodynamic modelling.

COMPETENCIES

- Investigation of wetting properties, investigation of surface properties, and the effect of surface modification processes
- Production and testing of thin films
- Investigation of the thermal behaviour of thin films and surface composites, the effect of heat treatments on the properties of nanostructured materials
- Examination of adsorption properties
- Thermodynamic modeling of material properties, wetting, and interface properties



SERVICES

- Perform soldering tests
- Perform wetting tests
- Creation of coatings from gas phase and aqueous solutions
- Production and investigation of carbon nanostructures from organic materials
- Thermodynamic modelling



TOOLS

- PVD equipment, Korvus Technology Ltd: RF and DC generators, heated sample holder, atomization from four sources at once, formation of pure metals and compounds
- Contact angle measuring equipment: wetting testing of molten metals, glass meltings, salt meltings, KSV evaluation software, use of high vacuum furnace (10⁻⁸ bar) and argon furnace (1 bar Ar), measuring possibility between 400 °C and 1100 °C
- Devices for the chemical production of nanostructures



REFERENCES

- Natur Motor Ltd.: Brazing experiments
- GMOZERO HUNGARY Ltd.: Gradient composites
- GINOP-2.3.2-15-2016-00027 project entitled "Sustainable operation of the workshop of excellence for the research and development of crystalline and amorphous nanostructured materials" (Preparation of nano-multilayered coatings)