

- **Laboratory of Metallurgical Processes**

Calculation of phase diagrams. Measurements of the activity of metal alloys, heat of formation of solutions and intermetallics phases, diffusion coefficients, density, viscosity, surface tension. Preparation of alloys in a manipulation chamber, providing high-purity argon atmosphere (nitrogen below 2 ppm, oxygen below 0,1 ppm, water vapour below 1 ppm).

- **Laboratory of Chemical Physics of Materials**

Stability of high temperature super-conductors. Chemical deposition (CVD) of boron nitride. Thermodynamic foundations of suspension process in copper metallurgy.

- **Laboratory of Functional and Structural Materials**

Investigation of crystalline structure and defects during martensitic transformation in copper alloys. Obtaining of alloys and inter-metallic compounds by mechanical alloying and powder metallurgy methods. Structure analysis of precipitates in aluminum alloys by techniques electron transmission microscopy.

- **Laboratory of Surface Engineering and Biomaterials**

The use of the laser technology based on the laser remelting and pulsed laser deposition (PLD) for the surface modification of materials. Complex diagnostic of the coatings structure for the following application: biomedical, tribological and quantum- electron with the X-ray diffraction, scanning and transmission electron microscopy application. Analysis of the profile of surfaces and residual stress measurements. Examination of physico- chemical features of coatings

- **Laboratory of Anisotropic Structures**

Quantitative analysis of crystallographic texture of polycrystalline materials. Quantitative phase analysis of textured materials. Analysis of the formation mechanism and development of the deformation and re-crystallization textures. Investigation of textures in surface layers.

- **Laboratory of Plastic Deformation of Metals**

The effect of deformation heterogeneity on microstructure, texture, acoustic emission and plastic anisotropy of metals. Strain hardening characteristics and the evolution of structure in composites, inter-metallic compounds and mono-crystalline materials. The laboratory is PCBC-certified to evaluate the mechanical properties of metals.

- **Laboratory of Multilayer Materials**

Multilayer materials obtained by the following technologies: plasma spraying of the oxide materials on the metallic substrate; characterization of microstructure; coating; segregation role in the surface layer; nitriding; modification of the surface layer of the iron based alloys. Environment friendly materials and technologies: new joining technologies by the diffusion soldering method (lead-free solders); defect engineering in polycrystalline silicon for the silicon solar cells.