

Subproject 4 “ Environment. Natural resources”

The scientific goal of the subproject consists in using the synergetic effects between cationic and nonionic reagents on the adsorption and hydrophoby of solid-liquid interface to develop the processing technology for complex ores and industrial wastes. The developed method in this subproject will be restricted to the reverse cationic flotation of iron ores.

The main aim is to reduce slag range, energy and raw materials consumption in metallurgy. The project began in 2004 as a common Ph.D. thesis between INPL and MISA. The project's goal was to strengthen the academic cooperation between France and Russia.

Firstly, the methodological approach aims at developing new reagent compositions that can be used as collectors for flotation. This approach is based on the synergetic effects between reagents of distinct molecular structures (aliphatic amine and surface-active nonionic substances) to remove ferromagnesian silicates (amphibole) from a fine fraction of ferric oxides. The second aspect of the research methodology concerns the use of column machines that will allow an effective flotation of fine particles as a consequence of favourable hydrodynamic conditions for collision and attachment between particles and air bubbles. In this context, the cooperation between LEM and the Institute of Continuous Media Mechanics of RAS of Perm is aimed at working out improved models of collision mechanisms between the particles and the deformable bubbles.

The task of the cooperation "research - industry" is to transfer to Russia the innovations which have been developed by the French industry partners (complexes of Michailovsky) and which have been carried out on the base of academic research in LEM and MISA.

The biodegradation of reagents used in the treatment is considered in LCPME and Irkutsk Technical State University works, which consists in conducting the investigations to the forms and structure of organic pollutants in environment and their transformation under the action of different factors.

The research topics with the use of the high power electromagnetic pulses (HPEMP) for the selective disintegration of the fine-grained mineral complexes, for the disclosure of the precious metals inclusions and their extraction in productive solutions constitutes one of main subjects of this section.

The main goal of the contribution on radioactive wastes storage is to associate data on fluid flow conditions and radionuclide transport processes, which occur at different spatial and temporal scales in Paleozoic fractured granitic rocks. The subjects of the examination are three sites at the Krasnokamensk area, Chita region, SE Siberia, Russia including surfaces of the SNF's potential of storage. The estimation of the radionuclide migration by the data from the studies for the lead-uranium systems completes the topic on pollutant migration in the environment.