##### V International Conference

##### “Fundamental Bases of Mechanochemical Technologies”

##### Preliminary Program

**Section I.**

**Theoretical Aspects of Mechanical Activation. Mechanochemical Reactions: Kinetics and Mechanisms.**

**Plenary lectures**

M. Senna. What could we learn from collisions among chemical species on the solid surfaces for rational fabrication of functional complex oxides?

V. Sepelak. Mechanochemical reactions followed on a local scale by NMR.

Rakesh Kumar. On the kinetics of reactions involving mechanically activated solids.

Shu Shaojun. The exploration of deepening international scientific and technological cooperation between China and Russia in the new era: new materials, energy conservation and environmental protection fields.

**Oral presentations**

F. Emmerling. New insights in mechanochemical processes using real-time in situ investigations.

B.P. Tolochko. Model experiments on beams of synchrotron radiation - Rayleigh-Taylor instability and its possible influence on elementary mechanochemical processes.

B.A. Zakharov. Towards understanding mechanical effects in solids: application of high pressure studies.

A.F. Fuentes. The pyrochlore structure: the perfect playground for mechanochemistry.

V.V. Kurbatkina. Experience of mechanical activation application for SHS of single phase super refractory carbides in Ta-Zr(Hf)-C systems.

E.I. Patsera. MA SHS technology for spherical powders of a heat proof NiAl.

M.A. Korchagin. Preparation of aluminum and magnesium diborides by thermal explosion in mechanically activated mixtures of initial reagents.

O.A. Shkoda. Mechanical activation and thermal explosion in a low-calorie powder mixture Nb + 2Si. Experiment and mathematical model.

Yu.A. Chumakov. Model of combustion of mechanically activated powder mixtures of Ti-C, Ti-B, Ti-Si.

A.V. Sobachkin. Phase formation in mechanically activated γ-irradiated Ti + Al mixture during high-temperature synthesis by induction heating.

T.F. Grigorieva. Study of the mechanism of mechanochemical interaction of hafnium, titanium and tantalum with carbon.

N.F. Uvarov. Concentration stresses and their influence on phase equilibria and surface effects in crystals.

S.A. Chizhik. Following the kinetics of solid state photochemical reaction by measurement of macroscopic mechanical response in crystals.

E.I. Golovneva. Molecular-dynamic study of damage to a nanorod under cyclic action.

G.A. Buzanov. Mechanochemical treatment of precursors in the synthesis of superstoichiometric spinels of Li-Mn-O Li-Mg-Mn-O systems.

N.V. Eremina. Mechanochemically stimulated synthesis of α-LiAlO2.

G.A. Pribytkov. Effect of processing metal-matrix SHS powders in a planetary mill on their dispersion, morphology, phase composition and fine phase structure.

A.V. Ukhina. Morphological and phases changes during Spark Plasma Sintering of mechanically activated carbon-metal mixtures.

Yu.A. Ivanova. The effect of mechanochemical activation on the phase composition, structure, and catalytic properties of Sr2TiO4.

D.S. Rybin. Correlation methods of analysis in the study of the kinetics of mechanochemical reactions.

T.P. Pateyuk. Kinetic parameters of dehydration during mechanosynthesis in the system "acid salt - zeolite".

D.V. Korabelnikov. The influence of pressure on the structure and electronic properties of oxyanionic crystals from the first principles.

I.A. Tumanov. Study of intermediate states in the mechanochemical reaction of glycine and malonic acid with water.

E.V. Ovchinnikov. Charge activity of mechanically activated particles.

G.R. Karagedov. Effect of mechanochemical treatment on Al(OH)3→α-Al2O3 transformation.

V.A. Volkov. Mechanisms of the formation of phases in the mechanosynthesis of Fe-C alloys.

A.L. Potapov. The formation of silver nanoparticles in a colloidal system and a polymer matrix.

F.M. Noskov. Description of polymorphous transformations in metals on the basis of the cluster model of structural formation.

**Poster presentations**

K. Tantardini. New insights in Bader’s Theory.

O.A. Shkoda. The effect of separate mechanical activation on thermal explosion in a niobium-silicon powder mixture.

E.M. Konstantinova. Influence of co-grinding on the kinetics of thermal decomposition in the Z/Al(OH)3 mixtures (Z = ZnO or Zn4CO3(OH)6·H2O).

I.A. Ditenberg. Features of microstructure and microhardness of multicomponent precursors based on refractory metal powders after mechanical activation of different duration.

I.A. Ditenberg. Multilayered composites based on Me-Al systems obtained by mechanical activation and subsequent consolidation by torsion under pressure.

B.S. Akhmetshin. Accumulation of energy by dispersed materials.

S.A. Petrova. Effect of mechanoactivation on the high-temperature behavior of systems with metastable phases.

**Section II.**

**Mechanochemical Synthesis. Mechanical Alloying.**

**Plenary lectures**

A. Moreira Jorge Jr. Effects of high-energy ball milling and reactive milling on the synthesis of Mg-Co and Mg-FeTi composites and Ti-Nb alloys and their hydrogen storage properties.

I.A. Bataev. Structure of mixing zones on the boundary of explosion-welded materials.

**Oral presentations**

A.A. Gusev. Mechanochemical synthesis of perovskites.

V.P. Isupov. Mechanically stimulated thermal synthesis of lithium aluminates.

T.A. Udalova. Preparation of ultradisperse copper powder by mechanochemical reduction of copper oxides by magnesium.

A.S. Akimov. A new solid-phase method for the synthesis of polyoxometallate compounds of molybdenum.

F.Kh. Urakaev. Mechanochemical synthesis of molybdenite.

V.A. Bolkov. Redistribution of alloying elements (Cr, Ni) in the mechanosynthesis of alloys of cementite composition.

K.А. Yazovskikh. Surface modification of Fe-Si-Al alloy under wet ball milling.

L.E. Bodrova. Initiation of the formation of mixtures from the ultra-dispersed α-Cu and β-Cr phases by mechanoactivation of the compositions "Cu powder - melt Сr".

A.V. Zhukov. Solid-phase conversion of uranium tetrafluoride by means of quartz mechanoactivated in the presence of additives of salts of alkaline elements.

S.A. Kovaleva. Mechanochemical synthesis of composite magnetic abrasive powders in exothermic Fe2O3-Fe-Me mixtures.

T.Yu. Kiseleva. Mechanochemistry of interaction in the ternary Fe-Ga-In system.

M. Zinigrad. Studying of oxide coatings formed on lightweight valve metals by micro arc oxidation into molten salt.

M. Zinigrad. Comparison of valve metal coating properties obtaining during micro arc oxidation treatment in aqueous solution and molten salt electrolytes.

**Poster presentations**

T.A. Udalova. Mechanochemical reduction of silicon and germanium oxides by magnesium.

S.V. Vosmerikov. Study of the concentration boundaries of the active metal in the preparation of metal / active metal composites for the reduction of oxides.

V.E. Porsev. Structural-phase transformations during mechanoactivation and subsequent isochronous annealing of Fe(X)Cr(1-X) alloys (X = 0.80, 0.70, 0.60, 0.52).

A.M. Kalinkin. Preparation of nano-sized iron (III) oxide by high-energy grinding.

T. Osserov. The use of Raman spectroscopy for the identification of sodium polysulphide obtained by the mechanochemical method.

N.G. Olimov. Formation of an extensive diffusion zone by the example of a binary system TiAl and NiAl.

V.R. Khusnutdinov. Synthesis of double hydroxides of tin and alkaline earth metals by the method of mechanical activation.

I.A. Borodulina. Effect of water vapor pressure on the mechanochemical synthesis of gamma lithium monoaluminate.

I. Akhmetova. Mechanochemical synthesis of metal phosphonates.

T.Yu. Kiseleva. Local structure and magnetic properties of mechanically synthesized composite materials containing iron and titanium carbides.

T.Yu. Kiseleva. Mossbauer spectroscopy in studies of multicomponent mechanically synthesized systems.

**Section III.**

**Mechanochemistry of Organic Systems and Plant Raw Materials.**

**Plenary lectures**

E.V. Boldyreva. Mechanochemistry of organic compounds. State of the art and challenges.

O.I. Lomovsky. Mechanochemistry of plant raw materials: problems and prospects.

N.Z. Lyakhov. Mechanochemical synthesis of solid disperse systems based on praziquantel and albendazole for the development of antiepisthorchiasis preparations.

**Oral presentations**

G. Cagnetta. A mechanochemical waste-to-materials approach for fluorine recovery from fluorinated pollutants and waste.

B.N. Kuznetsov. Catalytic transformations of mechanically activated wood into liquid biofuels in a supercritical ethanol medium.

Nouria Fatah. Synthesis of materials without solvent for production of ultra-clean hydrocarbon fuels.

T.A. Akopova. Synthesis of derivatives of polysaccharides by the method of solid phase reaction extrusion.

A.V. Dushkin. Mechanochemical methods for obtaining supramolecular delivery systems for biologically active molecules.

Wenhao Xu. Investigations on solid dispersions of valsartan with alkalizing agents: Preparation, characterization and physicochemical properties.

Ruiping Kong. Enhanced solubility and bioavailability of simvastatin and atorvastatin by mechanochemically obtained complexes.

Qihong Zhang. Preparation of curcumin self-micelle solid dispersion with enhanced bioavailability and cytotoxic activity by mechanochemistry.

M.B. Musaev. The possibilities of mechanochemical technology in obtaining an effective preparation based on triclabendazole for the treatment of fascioliasis.

L.P. Suntsova. Mechanochemical synthesis of solid disperse systems based on flavonoids and carotenoids for medicine and creation of dietary supplements.

S.S. Khalikov. A new approach in the development of complex preparations based on benzimidazole derivatives for the protection of plants.

E.S. Meteleva. Mechanochemical obtaining of means of protection of grain crops of increased efficiency and ecological compatibility.

M.V. Khvostov. The study of the pharmacological activity of supramolecular complexes of drugs with plant metabolites obtained by the mechanochemical method.

A.L. Bychkov. Effect of lignocellulosic substrate on the stability of cellulolytic enzymes in co-machining.

I.O. Lomovsky. The influence of mechanochemical treatment on the cellular structure and extraction characteristics of plant raw materials.

S.S. Khalikov. Mechanochemical method of obtaining anthelminthic drugs with increased activity.

I.A. Arkhipov. Anthelmintic properties of preparations obtained by mechanochemical technology.

N.G. Bazarnova. Comparison of micronization of medicinal substances by methods of mechanochemistry and supercritical fluid technologies.

V.V. Libanov. Mechanochemical synthesis of elementoorganosiloxanes.

A. Michalchuk. Complexities in the study of mechanochemical reactions of organic solids.

T.S. Demina. Solid-state modified chitosan for regenerative medicine.

T.N. Drebushchak. Structural similarity and similarity of properties in the polymorphism of tolbutamide and chlorpropamide.

A.N. Zhabaeva. Technology of water-soluble substances based on flavonoids by mechanochemical treatment.

N.A. Pankrushina. Mechanochemical extraction of *psoralea drupacea* secondary metabolites.

N.A. Pankrushina. Chemical constituent of *galega orientalis* water soluble substance produced by mechanochemical procedure.

E.M. Podgorbunskikh. Change in the degree of crystallinity of α-cellulose and real plant material in the process of mechanical activation.

Liu Xiao Jiao. Investigation of the influence of the fluid transfer fluid, chemically inert with respect to the sample, on the transformation in organic crystals caused by hydrostatic pressure.

B.E. Savdenbekova. Preparation of nanocomposites with antibacterial properties based on Ag-chitosan / Na-carboxymethylcellulose.

A.V. Mikhailovskaya. Mechanochemical synthesis of cocrystals of betulin.

**Poster presentations**

S.A. Kuznetsova. Effect of mechanical treatment on microwave-assisted synthesis of supramolecular complexes of betulin diacetate with arabinogalactan.

V.A. Bukhtoyarov. Effect of moisture on the efficiency of mechanochemical processing of plant raw materials.

V.I. Evseenko. Modification of nimesulide by mechanochemical methods.

D.V. Orlov. Mechanochemical solid-phase reactions with acids and bases for production of biologically active preparations.

A.S. Medvedeva. Mechanocomposites of piroxicam with chitosan of different molecular weight.

O.A. Rozhanskaya. In vitro biological activity of mechanocomposites.

**Section IV.**

**Mechanochemistry for the Design of New Materials Including Materials for Energetics and Additive Technologies.**

**Plenary lectures**

M.I. Alymov. Self-propagating high-temperature synthesis of perspective powder materials.

A.N. Streletsky. Mechanically activated composites based on transition metal oxides: defect structure, reactivity, application capabilities.

**Oral presentations**

A.I. Titkov. Obtaining nano- and micropowders of metals for additive technologies.

V.G. Bamburov. Effect of precursors NiCoMnOx on the mechanochemical synthesis of cathode material LiNi1/3Co1/3Mn1/3O2.

N.V. Kosova. New sodium-containing cathode materials: mechanochemical synthesis and electrochemical properties.

A.I. Ancharov. Mechanochemical and radiation technologies for obtaining new refractory materials.

K.A. Ivanichkina. Computer design and testing of silicene anodes for lithium-ion batteries.

A.S. Ulikhin. Composite solid electrolytes obtained by mechanical activation.

Yu.G. Mateishina. Use of mechanical activation to produce carbon-oxide composite materials.

A.A. Iskakova. Effect of mechanical activation on the transport properties of organic ionic conductors based on tetrabutylammonium salts.

V.G. Ponomareva. Synthesis of hybrid mechanocomposites with high proton conductivity using the method of mechanical activation.

A.A. Gaidamaka. Proton electrolytes in the system of hydrophosphates of rubidium, obtained with the help of mechanochemical methods.

P. Skriabin. Obtaining of protonic conductors by mechanochemical activations.

A.V. Loginov. Preparation of nanocomposite solid electrolytes with additions of nanodispersed tin oxides and stannates.

V.V. Zyryanov. Creation of thin oxygen membranes for pure distributed energy.

T.A. Fedushchak. Solid-state synthesis of massive sulfide hydrotreating catalysts.

A. Vasilevich. Mechanochemical synthesis of fine carbon composite containing Mo2C/C: new approach for the hydrodesulfurization catalysts preparation.

D. Sidorenko. Hybrid nanocomposites for extra wear resistant diamond cutting tools.

F.K. Gorbunov. New materials based on polyurethanes and mechanochemically obtained particles.

N.V. Filatova. The influence of chemical and mechanical prehistory on the synthesis of gahnite.

Sh.R. Kurbanbekov. Effect of mechanoactivation on the structure of the Ti-Al-Nb-based alloy obtained by the SPS method.

P.A. Loginov. Nanocrystalline mechanically alloyed Fe-Co-Ni binder with high strength and wear resistance for diamond tools.

Sh.E. Gabdrashova. Interaction of titanium with multi-walled carbon nanotubes during ball milling, heat treatment and Spark Plasma Sintering.

D.V. Dudina. Synthesis of titanium carbide nanoparticles in ball milled mixtures of amorphous Ti-containing alloys with carbon.

S.F. Tikhov. Construction of ceramometal porous catalyst and supports from powdered alloys prepared by mechanochemical method.

V.A. Poluboyarov. Mechanochemical method of modifying polyethylenes and polyamides.

S.A. Uspensky. Obtaining nanoparticles of boron in the process of ultrasonic cavitation.

E.V. Ovchinnikov. Physicomechanical characteristics of composite materials modified with mechanically activated particles.

M.A. Eremina. Mechanosynthesis of nanocomposites "TiC (NbC) - copper binder" using liquid hydrocarbons.

A.V. Pavlov. Structural studies of composite (BeO + TiO2) ceramics.

G.V. Chernova. Use of waste mechanochemical processing lignin-cellulose raw materials for environmental clean energy.

E.M. Dovydenko. 3D printing with biologically compatible hydrogels.

**Poster presentations**

V.A. Belotserkovsky. Mechanically stimulated solid-phase synthesis and study of the possibility of chemical and electrochemical Na+ / Li+ ion exchange in the cathode material Na4Fe3(PO4)2P2O7.

O.A. Podgornova. Cathodic materials based on LiFe0.5Mn0.5PO4: the influence of the synthesis method on structure, morphology and electrochemical properties.

D.O. Rezepova. Mechanically stimulated solid-phase synthesis of composite cathode materials based on Na3V2(PO4)2F3 for sodium and lithium-ion batteries.

A.A. Shindrov. Mechanochemical synthesis of manganese carbonophosphate and sodium - a new cathode material for Na-ion batteries.

E.V. Shubnikova. Studies of the structure and oxygen permeability of nonstoichiometric oxides based on perovskites SCF / BSCF.

K. Chesnokov. Transport properties in the oxide series LaSr2(Fe1-xMnx)3O9-d, х= 0.1 - 0.33

V.T. Senyut. Features of the structure of the composite material obtained on the basis of BN - (TiN, AlN) after mechanoactivation and sintering under pressure.

B.S. Sadykov. Mechanochemical activation and modification of metallic powders for energy condensed systems.

S.P. Yakovleva. Design of interphase boundaries for the synthesis of highly resistant diamond-carbide materials using diamond diffusion metallization.

L.A. Kuzovnikova. Influence of intensive plastic deformation on the structure and magnetic properties of metal-insulator nanocomposites Al2O3 / Co (P).

V.R. Khusnutdinov. Mechanochemical synthesis of nanocomposites based on Fe3O4 and layered double hydroxides.

**Section V.**

New Mechanochemical Technologies.

**Plenary lectures**

T.A. Ketegenov. Technogenic fillers for polymeric materials.

**Oral presentations**

A.M. Kalinkin. Mechanoactivated geopolymeric binder based on the ash of thermal stations.

Yu Hongbo. Comparison studies of laboratory and industrial mills and scale application of laboratory achievements.

M.V. Chaikina. Mechanical activation of chemical processes: cases of apatite and calcium orthophosphates.

N.V. Bulina. Application of mechanochemical technologies for the synthesis of Sr-substituted apatite.

E.G. Komarova. Regularities in the growth of biocoatings when deposited by the microarc method of mechanochemically synthesized strontium-silicon substituted hydroxyapatite.

K.V. Mishchenko. Use of mechanical activation to produce bismuth solutions.

N.V. Yudina. Mechanochemical activation of humic systems.

T.S. Skripkina. Mechanochemical modification of humic acids of brown coal for creation of complex sorbents of heavy metals.

N.P. Bgatova. The use of mechanically activated lithium carbonate to induce the death of a cancer cell.

Z.A. Korotaeva. Mechanochemical method for creating an effective binder for corundum products.

L.K. Berdnikova. Modification of gray iron and steel effective compositions obtained mechanochemical method.

E.F. Sutormina. Regularities in the formation of Mn-substituted cordierites in the mechanochemical effect.

A. Arshanitsa. Effect of disentigrator treatment on dispersity and physical-chemical characteristics of hydrolysis lignin.

M.A. Markova. Development of PCM based on PTFE and HC with the use of technology of joint mechanoactivation of components.

I.A. Massalimov. Sulfur: processing and application directions.

N.V. Filatova. Activated synthesis of mullite.

E.V. Ovchinnikov. Tribotechnical characteristics of mechanically activated thin-layer coatings.

A.V. Kuznetsov. Studies of the kinetics of thermal decomposition and combustion of mechanically activated coals after micromilling.

F.E. Safarov. Mechanochemical transformations of polymers during filtration in porous media and gap structures as the basis of the selectivity of technologies for equalizing the injectivity profile.

**Poster presentations**

Yu.D. Kaminsky. Mechanochemistry for ecology.

V.G. Surkov. Mechanochemical treatment of oil shale in a supercritical solvent medium.

V.G. Surkov. Transformations of tar and asphaltene tar oil mechanically processed at elevated temperatures.

E.M. Konstantinova. The effect of mechanochemical activation on thermal synthesis in mixtures based on metakaolin and sodium hydroxide.

R. Nadirov. Effect of mechanochemical treatment on leachability copper smelter slag in sulfuric acid.

E.V. Bogatyreva. Features of structural changes in the REM-containing phase of eudialyte concentrate after mechanoactivation.

N.M. Mukhamedova. Mechanical properties of a ceramic material obtained by spark-sintering.

N.E. Mukhamedov. Method for manufacturing a prototype of a corium of a nuclear reactor by induction heating.

A.A. Bekisheva. Anti-corrosive facing alloy for submersible oil-producing equipment parts restoring and protection.

A.V. Savelieva. Change in the colloidal properties of humic substances during mechanochemical activation.

D.I. Senchurova. Solid-state enrichment of products of mechanochemical treatment of plant raw materials.

Yu.O. Menshova. Use of mechanocomposites of green tea as antioxidant additives for the development of functional products.

D.V. Gosman. Mechanoenzymatic obtaining in the solid phase of protein hydrolyzate for the development of new products for special purposes.