

# CONTENTS

## **Problems of Planetology, Cosmochemistry and Meteoritica 6**

Barenbaum A.A. On the scientific revolution in the comparative planetology .....	6
Basilevsky A.T. <sup>1,2,3</sup> , Krasilnikov S.S. <sup>1,2,3</sup> , Skripnik A.Ya. <sup>1</sup> , Lorenz C.A. <sup>1</sup> , Shiryayev A.A. <sup>4,5</sup> , Mall U. <sup>2</sup> , Keller H.U. <sup>6</sup> , Skorov Yu.V. <sup>2</sup> , Mottola S. <sup>7</sup> , Hvid S.F. <sup>7,1</sup> Strength and texture of material of 67P comet nucleus based on the data taken by Rosetta mission. ....	8
Yurkovets V.P. Moissanite in rocks of the Ladoga area as an indicator of the Ladoga impact.....	11
Shornikov S. I. Thermodynamics of forsterite evaporation .....	12
Yakovlev O. I. and Shornikov S. I. The evaporation peculiarities of Ca–Al–Inclusions of chondrites	14
Kadik A.A., Koltashev V.V., Kryukova E.B., Tsekhonya T.I., Plotnichenko V.G. Source of oxygen in experimental iron-bearing silicate melts equilibrated with metal phase at high pressures and low oxygen fugacity values.....	15
Kronrod V.A., Kuskov O.L. Agreement between lunar crustal porosity, thermal conductivity and uranium concentration in the crust and mantle. ....	17
Lavrentjeva Z.A., Lyul A.Yu. Fractionation of siderophile elements in magnetic grain-sized fractions from Abee EH4, Adhi Kot EH4, Atlanta EL6 and Pillistfer EL6 of enstatite chondrites.....	19
Tselmovich V.A. <sup>1</sup> , Kurazhkovskii A.Yu. <sup>1</sup> , Kazansky A.Yu. <sup>2</sup> , Shchetnikov A.A. <sup>3</sup> , Research of the holocene events recorded in the peat by the magnetic and microprobe data. ....	21
Kronrod E.V. <sup>1</sup> , Kuskov O.L. <sup>1</sup> , Matsumoto K. <sup>2</sup> , Yamada R. <sup>2</sup> , Computational modeling of the internal structure and composition of the Moon with inversion of gravitational, seismic and geochemical data. ....	23
Dunaeva A.N., Kronrod V.A., Kuskov O.L. Thermal stability conditions for the internal ocean in the models of partially differentiated satellites Callisto and Titan. ....	24
Shpekin M.I. <sup>1</sup> , Barenbaum A.A. <sup>2</sup> , On two physical mechanisms interaction of galactic comets with terrestrial planets .....	26

## **Mineral equilibria at high PT-parameters 28**

Ashchepkov I.V., Sobolev V.S. Amphibole thermobarometer for mantle rocks (preliminary version). УДК 551.22- 552.11 .....	28
Marchenko E.I., Eremin N.N. Computer modeling of Ca- and Mg- perovskites containing Al atoms under Earth's mantle thermodynamic conditions. ....	29
Khodorevskaya L.I., Varlamov D.A. Experimental study of amphibole's interaction with NaCl-KCl-H <sub>2</sub> O fluids: applications to high-temperature alkaline metasomatism of basic rocks. ....	31
Limanov E.V. <sup>1,2</sup> , Kuzyura A.V. <sup>1</sup> , Bovkun A.V. <sup>2</sup> , Litvin Yu.A. Genetic classification of primary growth inclusions in upper mantle diamonds (according to the physico-chemical experiments).....	32

**Thermodynamic properties of minerals and fluids 35**

Eremin O.V. <sup>1)</sup> , Epova E.S. <sup>1)</sup> , Rusal O.S. <sup>1)</sup> , Bychinskii V.A. <sup>2)</sup> Calculation of standard thermodynamic potentials of Cs-zeolites .....	35
Eremin O.V. <sup>1)</sup> , Borzenko S.A. <sup>1)</sup> , Epova E.S. <sup>1)</sup> , Rusal O.S. <sup>1)</sup> , Bychinskii V.A. <sup>2)</sup> Estimation of the Gibbs free energy for fluorocarbonates of light lanthanides.....	37
Sokolova T.S., Danilov B.S. Additive approach to estimating of standard thermodynamic functions of charoite .....	39
Zakirov I.V., Suvorova V.A. The first experimental data on solubility of tin in the steam phase in the H <sub>2</sub> O-SnO <sub>2</sub> system.....	39
Shornikov S. I. Thermodynamic properties of the CaO–MgO–SiO <sub>2</sub> melts .....	40
Shornikov S.I. High-temperature thermodynamic properties of MgAl <sub>2</sub> O <sub>4</sub> spinel .....	42
Mironenko M.V., Cherkasova E.V. Thermodynamic modeling behavior of bromide in processes of evaporation and freezing of sea water. ....	44
Grazhdannikov S.A., Kurus' A.F., Krinitsyn P.G., Isaenko L.I., Drebuschak V.A. LiGaTe <sub>2</sub> crystal growth, modeling of the crystal growth process. ....	46
Korobova E.M. <sup>1)</sup> , Kolmykova L.I. <sup>1)</sup> , Gromyak I.N. <sup>1)</sup> , Korsakova N.V. <sup>1)</sup> , Makarova E.M. <sup>2)</sup> , Golubkina N.A. <sup>3)</sup> Seasonal dynamics of iodine and selenium in natural water of different geochemical origin. ....	48
Osadchii Valentin O. <sup>a,b</sup> An experimental study of the solubility of Bi <sub>2</sub> O <sub>3</sub> and Sb <sub>2</sub> O <sub>3</sub> in H <sub>2</sub> O vapor .....	50
Zakirov <sup>a</sup> Ildar V., Suvorova <sup>a</sup> Valeria A.* , Osadchii <sup>a,b</sup> Valentin O. An experimental study of the solubility of tin in H <sub>2</sub> O vapor .....	51
Polotnyanko N.A. <sup>1)</sup> , Tyurin A.V. <sup>2)</sup> , Kristavchuk A.V. <sup>3)</sup> , Chareev D.A. <sup>3)</sup> , Gavrichev K.S. <sup>2)</sup> Heat capacity and thermodynamic properties of palladium sulfides.....	52
Aleksandrova E.V. Modeling of colloidal particles sorption on country rocks. ....	53
Bublikova T.M., Balitsky V.S. Experimental Determination of the Heat Capacity of Basic Copper Carbonates (Malachite and Azurite) .....	54

**Synthesis of minerals 56**

Yamnova N.A., Gurbanova O.V., Borovikova E.Yu., Volkov A.S., Dimitrova O.V. Synthesis, crystal structure features, IR-spectroscopy and properties of natural calcium metaborates synthetic analogs and new Na,Ca carbonate–borate. ....	56
Sinyakova E.F., Kosyakov V.I. Types of platinum-bearing pentlandite in the Cu-Fe-Ni-S system.....	57

**Hydrothermal equilibria and ore formation 60**

# CONTENTS

Kotova N.P. Experimental study of effect of fluorides concentration and fluid pressure on niobium oxide solubility at T = 550° C and P = 50 and 100 MPa (Co-CoO buffer).....	60
Korzhinskaya V.S., Kotova N.P Experimental study of fluid composition (hf+hcl) influence on niobium behavior when dissolving pyrochlore and niobium oxide at T = 550 °C, P = 1000 BAR (Co-CoO BUFFER). .....	61
Tauson <sup>1,2</sup> V.L., Akimov <sup>1,2</sup> V.V., Spiridonov <sup>1,2</sup> A.M., Budyak <sup>1,2</sup> A.E., Lipko <sup>2</sup> S.V., Smagunov <sup>2</sup> N.V., Arsent'ev <sup>3</sup> K.Yu. Correlation of experimental and natural (black-shale deposits) data on noble metal speciation and distribution in ore minerals.....	63
Tarnopolskaia M.E, Bychkov A.Yu. Experimental study of stability of fluoride iron (iii) complexes in hydrothermal solutions .....	66
Akimov V.V. <sup>1</sup> , Arsent'ev K.Yu. <sup>2</sup> Behavior of gold nanoparticles in synthetic rock under thermo-gradient hydrothermal conditions .....	66
Arsept'ev K.Yu. <sup>1</sup> , Voronova I.Yu., <sup>2</sup> Lipko S.V., <sup>2</sup> Tauson V.L. <sup>2</sup> Evolution of small-size phases on the surface of pyrite crystals in the system FeS <sub>2</sub> – Ag - Pt. ....	68
Popova <sup>1</sup> Y.A., Bychkov <sup>1</sup> A.Yu., Matveeva <sup>1</sup> S.S., Bychkova <sup>2</sup> Ya.V. Geochemical features of lanthanides behavior at the formation of tungsten deposits .....	70

## **The formation and differentiation of magmas** **71**

Suk N.I., Kotelnikov A.R., Polskoy P.F. Experimental study of melting of malginit from Lovozerskiy massif (T=1250°C, P=3 kbar).....	71
Solovova I.P., Averin A.A., Ryabchikov I.D., Shiryayev A.A. Fe-Ni-Co alloy, sulphides and graphite in equilibrium with CH <sub>4</sub> - dominant fluid (magnesia basalt, O. Disco, West Greenland). ....	73
УДК 550.4.02 Konyshev A.A. <sup>1,2</sup> , Zubkov E.S. <sup>2</sup> Fluorine concentration in the Li-F granite fluid, salmi pluton: an evaluation based on experimental data of melting.....	75
Deviatova V.N. <sup>1</sup> , Simakin A.G. <sup>1,2</sup> Experimental study of nucleation and growth of the diopside in the AB-DI melt at P=0.2 GPa. ....	76
Stepanov O.V. <sup>1</sup> , Chertkova N.V. <sup>2</sup> , Plechov P.Y. <sup>1</sup> , Persikov P.Y. <sup>2</sup> , Bukhtiyarov P.G. <sup>2</sup> Analytical methods for determination of high water concentrations in obsidian glasses. ....	78
Nazarova D.P., Portnyagin M.V., Krashennnikov S.P. H <sub>2</sub> O content in parental magmas of Kamchatka. ....	80
Krashennnikov S.P. <sup>1</sup> , Sobolev A.V. <sup>1,2</sup> , Batanova V.G. <sup>1,2</sup> , Kargaltsev A.A. <sup>1</sup> , Borisov A.A. <sup>1,3</sup> The new high-temperature apparatus for one-atmosphere gas mixing experiments at Vernadsky institute: the first results.....	81
Kuzyura A.V. <sup>1</sup> , Litvin Yu.A. <sup>1</sup> , Limanov E.V. <sup>1,2</sup> , Varlamov D.A. <sup>1</sup> Experimental modeling of physico-chemical differentiation mechanism of ultrabasic magma in the earth mantle. ....	82

## **Physical chemical properties of geomaterials** **84**

Koroleva O.N., Ivanova T.N., Korobatova N.M., Korinevskaya G.G., Shtenberg M.V. Investigation of alkali borongerminate glasses by means of vibrational spectroscopic ..... 84

## **Experimental geoecology 84**

Maghidov S.Kh. Man-made change in the balance of thermobaric conditions in the earth's interiors of the russian federation and global environmental risks. .... 84

Ermakov V.V., Khushvakhtova S.D., Tyutikov S.F., Danilova V.N., Safonov V.A., Krechetova E.A. Geochemical ecology of plants under conditions of polymetallic biogeochemical provinces. .... 86

Asavin A.M.<sup>1</sup>, Ignatov Yr.A.<sup>1</sup>, Litvinov A.V.<sup>2</sup> Experimental calibration of MDS-type gas sensors by gas mixtures and vacuum. .... 88

Alekhin Y.V., Makarova M.A., Shipilova E.S., Makarov M.I. The study of migration forms of trace elements in natural waters of West Africa ..... 90

## **Engineering of experiment 93**

Patonin A.V., Shikhova N.M. The method of axial deformationcalculating of the specimen in testing at the inova press ..... 93

Yakov I. Korepanov, Nikolai N. Zhdanov, Evgenii G. Osadchii. Method and techniques of determination activity of silver in Ag-Au alloys ..... 94

## **Interaction in the systems of fluid–melt–crystal 97**

Salova T.P., Simakin A.G. Transfer platinum dry reduced fluid system CO-CO<sub>2</sub> at p=2 kbar ..... 97

Korneeva A.A., Chevychelov V.Yu. Partitioning of volatile components (Cl, H<sub>2</sub>O, CO<sub>2</sub>) between fluids and various magmatic melts at T=1000°C and P=200 MPa ..... 98

Chevychelov V.Yu. Change of Nb/Ta ratio in granitoid melts depending on the composition of dissolved Ta-Nb mineral and melt composition ..... 99

## **Authors index 101**