СПИСОК ЛИТЕРАТУРЫ

1. Бердников Н.В., Коновалова Н.С., Зазулина В.Е. Исследование включений благородных металлов в высокоуглеродистых породах методом РЭМ-РСМА // Тихоокеан. геология. 2010. Т. 29, № 2. С. 90–96.
2. Гамянин Г.Н., Жданов Ю.Я., Сыромятникова А.С. Состав и структурные особенности сфероидов из золоторудных месторождений Восточной Якутии // Зап. ВМО. 1999. Вып. 5. С. 71–76.
3. Геологическая карта Российской Федерации. 1:200 000. СПб.: ВСЕГЕИ, 2000.
4. Диденко А.Н., Каплун В.Б., Малышев Ю.Ф., В.Ф. Шевченко. Структура литосферы и мезозойская геодинамика востока Центрально-Азиатского складчатого пояса // Геология и геофизика. 2010. Т. 51, № 5. С. 629–647.
5. Копылов М.И., Плотницкий Ю.Е., Родионов С.М., Романовский Н.П. Месторождения олова Хингано-Олонойского района: геологическая и геофизическая характеристика, рудная минерализация и развитие ресурсной базы. Владивосток: ДВО РАН, 2004. 252 с.
6. Костин А.В. Минеральные разновидности Fe-оксидных-Cu руд проявлений Джалкан, Росомаха и Хурат (Сетте-Дабан, Восточная Якутия) // Отеч. геология. 2016. № 6. С. 11–15.
7. Левашев Г.Б. Геохимия парагенных магматитов активных зон континентальных окраин. Владивосток: ДВО АН СССР, 1991. 380 с.
8. Лукин А.Е. Минеральные сферулы - индикаторы специфического флюидного режима рудообразования и нафтидогенеза // Геофиз. журн. 2013. Т. 35, № 6. С. 10–53.
9. Маракушев А.А., Иванов И.П., Римкевич В.С. Значение ликвации в генезисе магматических горных пород // Вестн. МГУ. Сер. 4. геол. 1979. Вып. 1. С. 3–22.
10. Маршинцев В.К., Яценко И.Г., Зинченко В.Н. Силикатные сферулы из кимберлитовых и лампроитовых формаций мира // Наука и техника в Якутии. 2018. № 2 (35). С. 7–11.
11. Новгородова М.И., Гамянин Г.Н., Жданов Ю.Я. и др. Микросферулы алюмосиликатных стекол в золотых рудах // Геохимия. 2003. № 1. С. 83–93.
12. Савва Н.Е., Фомина М.И., Курашко В.В. и др. Сфероидные образования в рудах золото-сульфидного проявления «Сентябрьское СВ», локализованного в трубчатых телах эксплозивных брекчий (Чукотка) // Благородные, редкие и радио-активные элементы в рудообразующих системах: Материалы Всерос. науч. конф. Новосибирск, 2014. С. 626–630.
13. Сандимирова Е.И. Сферические минеральные образования вулканических пород Курильских островов и Камчатки: Автореф. дис. ... канд. геол.-минер. наук. Петропавловск-Камчатский, 2008. 24 с.
14. Синякова Е.Ф., Косяков В.И. Поведение примесей благородных металлов при фракционной кристаллизации Cu-Fe-Ni-сульфидных расплавов, содержащих As И Co // Геология и геофизика. 2012. Т. 53, № 10. С. 1374–1400.
15. Соловьев, С.Г. Железоокисно-золото-медные и родственные месторождения. М.: Науч. мир, 2011. 472 с.
16. Ханчук А.И., Раткин В.В., Рязанцева, М.Д. и др. Геология и полезные ископаемые Приморского края / Очерк. Владивосток: Дальнаука, 1995. 65 с.
17. Ханчук А.И., Рассказов И.Ю., Крюков В.Г., Литвинова Н.М., Саксин Б.Г. О находке промышленной платины в рудах Южно-Хинганского месторождения марганца // Докл. АН. 2016. Т. 470, № 6. С. 701–703.
18. Хитаров Н.И., Пугин В.А. Ликвация в природных силикатных системах // Геохимия. 1978. № 6. С. 803–819.
19. Чайковский И.И., Коротченкова О.В. Эксплозивные минеральные фазы алмазоносных вишеритов западного Урала // Литосфера. 2012. № 2. С. 125–140.
20. Чудненко К.В., Пальянова Г.А. Термодинамические свойства твердых растворов в системе Ag-Au-Cu // Геология и геофизика. 2014. Т. 55, № 3. С. 449–463.
21. Andronikov A.V., Andronikova I.E., Loehn C.W. et al. Implications from chemical, structural and mineralogical studies of magmatic microspherules from around the Lower Younger Dryas boundary (New Mexico, USA) // Geografiska Annaler: series A, Physical Geography. 2016. V. 98. P. 39–59.
22. Barra F., Reich M., Selby D. et al. Unravelling the origin of the Andean IOCG clan: a Re-Os isotope approach // Ore Geol.Rev. 2017. V. 81. P. 62–78.
23. Barton M.D., Johnson A.D. Evaporite-source model for igneous-related Fe oxide-(REE-Cu-Au-U) mineralization // Geol. 1996. V. 24. P. 259–262.
24. Barton M.D. Iron oxide (Cu-Au-REE-P-Ag-U-Co) systems // Treatise in geochemistry. 2nd ed. 2014. P. 515–541.
25. Beitler B.B., Benison K.C., Oboh-Ikuenobe F.E. et al. Active hematite concretion formation in modern acid saline lake sediments, Lake Brown, Western Australia // Earth Planet.Sci. Lett. 2008. V. 268 P. 52–63.

26. Berdnikov N.V., Nevstruev V.G., Kepezhinskas P.K. et al. PGE mineralization in andesite explosive breccias associated with the Poperechny iron-manganese deposit (Lesser Khingan, Far East Russia): whole-rock geochemical, ^{190}Pt-^{4}He isotopic, and mineralogical evidence // Ore Geol. Rev. 2020. V. 118. 103352.
27. Bryan W.B. Morphology of quench crystals in submarine basalts // J. Geophys. Res. 1972. V. 77. P. 5812–5819.
28. Cannon W.F., Schultz K.J., Wright-Horton J. et al. The sudbury impact layer in the Paleoproterozoic iron ranges of northern Michigan // Geol. Soc. Am. Bull. 2010. V. 122. P. 50–75.
29. Carracedo-Sánchez M., Sarrionandia F., Arostegui J. et al. Silicate glass micro- and nanospherules generated in explosive eruptions of ultrabasic magmas: implications for the origin of pelletal lapilli // J. Volcanol. Geotherm. Res. 2015. V. 293. P. 13–24.
30. Cashman K.V., Mangan M.T. Physical aspects of magmatic degassing II: constraints on vesiculation processes from textural studies of eruptive products // Rev. Mineralogy. 1994. V. 30. P. 447–478.
31. Chaplygin I.V., Yudovskaya M.A., Vergasova L.P. et al. Native gold from volcanic gases at Tolbachik 1975-1976 and 2012-2013 fissure eruptions, Kamchatka // J. Volcanol. Geotherm. Res. 2015. V. 307. P. 200–209.
32. Charlier B., Grove T.L. Experiments on liquid immiscibility along tholeiitic liquid lines of descent // Contrib. Miner. Petrol. 2012. V. 164. P. 27–44.
33. Chiaradia M., Banks D., Cliff R. et al. Origin of fluids in iron oxide-copper-gold deposits: constraints from $\delta^{37}Cl$, $^{87}Sr/^{86}Sr_i$ and Cl/Br // Minerali. Deposita. 2006. V. 41. P. 565–573.
34. Childress T.M., Simon A.C., Reich M. et al. Formation of the Mantoverde iron oxide-copper-gold (IOCG) deposit, Chile: insights from Fe and O stable isotopes and comparisons with iron oxide-apatite (IOA) deposits // Mineral. Deposita. 2020. V. 55. P. 1489–1504.
35. De Haller A., Vorfu F., Fontbote L. et al. Geology, geo-chronology, and Hf and Pb isotope data of the Raul-condestable iron oxide-copper-gold deposit, central coast of Peru // Econ. Geol. 2006. V. 101. P. 281–310.
36. Del Real I., Thompson J.F.H., Simon A.C. et al. Geochemical and isotopic signature as pyrite as a proxy for fluid source and evolution in the Candelaria-Punta del Cobre iron oxide copper-gold district, Chile // Econ. Geol. 2020. V. 115. P. 1493–1518.
37. Dixon S., Rutherford M.J. Plagiogranites as late-stage immiscible liquids in ophiolite and mid-ocean ridge suites: an experimental study // Earth Planet. Sci. Lett. 1979. V. 45. P. 45–60.
38. Fialkiewicz-Koziel B., Smieja-Krol B., Frontasyeva M. et al. Antrhopogenic and natural sources of dust in peatland during the Anthropocene // Sci. Reports. 2016. V. 6, doi: 10.1038/srep38731.
39. Fujii T., Kushiro I., Nakamura Y. et al. A note on silicate liquid immiscibility in Japanese volcanic rocks // J. Geol. Soc. Japan. 1980. V. 86. P. 409–412.
40. Genge M.J., Davies B., Suttle M.D. et al. The mineralogy and petrology of I-type cosmic spherules: implications for their sources, origins and identification in sedimentary rocks // Geochim. Cosmochim. Acta. 2017. V. 218. P. 167–200.
41. Glikson A. Early Archaean asteroid impacts on Earth: stratigraphic and isotopic age correlations and possible geodynamic consequences // Earth's Oldest Rocks. Netherlands: Elsevier, 2007. P. 1087–1103.
42. Goldstein J.I., Newbury D.E., Michael J.R. et al. Scanning electron microscopy and X-ray microanalysis. New York: Springer, 2017. 550 p.
43. Grebennikov A.V. Silica-metal spherules in ignimbrites of Southern Primorie, Russia // J. Earth Sci. (China). 2011. V. 22. P. 20–31.
44. Greenwood N., Earnshaw A. Chemistry of the elements (2nd ed.). UK. Oxford: Butterworth-Heinemann, 1997. 1359 p.
45. Hagstrum J.T., Firestone R.B., West A. et al. Impact-related micro-spherules in Late Pleistocene Alaskan and Yukon «muck» deposits signify recurrent episodes of catastrophic emplacement // Sci. Reports, 2017. V. 7. doi: 10.1038/s41598-017-16958-2.
46. Haynes D.W., Cross K.C. Bills, R.T. et al. Olympic Dam ore genesis: a fluid-mixing model // Econ. Geol. 1995. V. 90. P. 281–307.
47. Hedenquist J.W., Lowenstern J.B. The role of magmas in the formation of hydrothermal ore deposits // Nature. 1994. V. 370. P. 519–527.
48. Honour V.C., Holness M.B., Partridge J.L. et al. Microstructural evolution of silicate immiscible liquids in ferrobasalts // Contrib. Mineral. Petrol. 2019 V. 174, # 77. doi.org/10.1007/s00410-019-1610-6.
49. Hou T., Charlier B., Nemur O. et al. Experimental study of liquid immiscibility in the Kiruna-type Verdenoeg iron-fluorine deposit, South Africa // Geochim. Cosmochim. Acta. 2017. V. 203. P. 303–322.

50. Hunger R.B., Xavier R.P., Moreto C.P.N. et al. Hydrothermal alteration, fluid evolution, and Re-Os geochronology of the Grota Funda iron oxide copper-gold deposit, Carajas Province (Para State), Brazil // Econ. Geol. 2018. V. 113. P. 1769–1794.
51. Hunt J.A., Baker T., Thorkelsen D.J. A review of iron oxide copper-gold deposits, with focus on the Wernecke Breccias, Yukon, Canada, as an example of a non-magmatic end member and implications for IOCG genesis and classification // Exploration and mining geology. 2007 V. 16. P. 209–232.
52. Isobe H., Gondo T. Dendritic magnetite crystals in rapid quenched fine spherules produced by falling experiments through the high temperature furnace with controlled gas flow // J. Mineral. Petrol. Sci. 2013. V. 108. P. 227–237.
53. Jakobsen J.K., Veksler I.V., Tegner C. et al. Immiscible iron- and silica-rich melts in basalt petrogenesis documented in the Skaergaard intrusion // Geol. 2005. V. 33. P. 885–888.
54. Jin X., Zhu H. Determination of platinum group elements and gold in geological samples with ICP-MS using a sodium peroxide fusion and tellurium co-precipitation // J. Analytical Atomic Spectrometry. 2000. V. 15. P. 747–751.
55. Jonsson E., Troll V.R., Hogdal K. et al. Magmatic origin of giant «Kiruna-type» apatite-iron-oxide ores in Central Sweden // Sci. Records. 2013. V. 3. P. 1644.
56. Kamenetsky V.S., Charlier B., Zhitova L. et al. Magma chamber-scale liquid immiscibility in the Siberian Traps represented by melt pods in native iron // Geol. 2013. V. 41. P. 1091–1094.
57. Kepezhinskas P., McDermott F., Defant M.J. et al. Trace element and Sr-Nd-Pb isotopic constraints on a three-component model of Kamchatka Arc petrogenesis // Geochim. Cosmochim. Acta. 1997. V. 61. P. 577–600.
58. Kepezhinskas P., Kepezhinskas N., Berdnikov N. Gold, platinum and palladium enrichments in arcs: role of mantle wedge, arc crust and halogen-rich slab fluids // E3S Web of Conferences. 2019. V. 98. 08010. doi.org/10.1051/e35conf/20199808010.
59. Kepezhinskas P.K., Kepezhinskas N.P., Berdnikov N.V. et al. Native metals and intermetallic compounds in subduction-related ultramafic rocks from the Stanovoy mobile belt (Russian Far East): implications for redox heterogeneity in subduction zones // Ore Geol. Rev. 2020. V. 127. 103800.
60. Knight J. Phase relations in the system Au-Cu-Ag at low temperatures, based on natural assemblages // Can.Mineralogist. 2001 V. 39. P.889–905.
61. Knipping J.L., Bilenker L.D., Simon A.C. et al. Giant Kiruna-type deposits form by efficient flotation of magmatic magnetite suspensions // Geol. 2015 V. 43. P. 591–594.
62. Knipping J.L., Webster J.D., Simon A.C. et al. Accumulation of magnetite by flotation on bubbles during decompression of silicate magma // Sci. Reports. 2019. V. 9. 3852. doi.org/10.1038/s41598-019-40376-1.
63. Kutchko B.G., Kim A.G. Fly ash characterization by SEM-EDS // Fuel. 2006. V. 85. P. 2537–2544.
64. Kuo L.-C., Lee J.Y., Essene E.J. et al. Occurrence, chemistry, and origin of immiscible silicate glasses in a tholeiitic basalt: a TEM/AEM study // Contrib. Miner. Petrol. 1986. V. 94. P. 90–98.
65. Lefevre R., Gaudichet A., Billon-Galland M.A. Silicate microspherules intercepted in the plume of Etna volcano // Nature. 1986. V. 322. P. 817–820.
66. Le Maitre R.W., Bateman P., Dudek,A. et al. A classification of igneous rocks and glossary of terms: recommendations of the International Union of Geological Sciences, Subcommission on the systematics of igneous rocks (No. 552.3 CLA) // Intern.Union Geol. Sci. 1989. P. 193.
67. Lowe D.R., Byerly G.R. Early Archean silicate spherules of probable impact origin, South Africa and Western Australia // Geol. 1986. V. 14. P. 83–86.
68. McBirney A.R. and Nakamura Y. Immiscibility in late-stage magmas of the Skaergaard intrusion // Carnegie Institute of Washington Yearbook, 1974. V. 72. P. 348–352.
69. Meeker G.P., Hinkley T.K. The structure and composition of micropsherules from the Kilauea volcano, Hawaii // Am. Mineralogist. 1993. V. 78. P. 873–876.
70. Meeker K., Chuan R.L., Kyle P.R. Emission of elemental gold particles from Mount Erebus, Ross Island, Antarctica // Geophys. Res. Lett. 1991. V. 18. P. 1405–1408.
71. Mungall J.E., Long K., Brenan J.M. et al. Immiscible shoshonitic and Fe-P-oxide melts preserved in unconsolidated tephra at El Laco volcano, Chile // Geol. 2018. V. 46. P. 255–258.
72. Naslund H.R. The effect of oxygen fugacity on liquid immiscibility in iron-bearing silicate melts // Am. J. Sci. 1983. V. 283. P. 1034–1059.
73. Naslund H.R., Henriquez F., Nyström J.O. et al. Magmatic iron ores and associated mineralization: examples from the Chilean High Andes and Coastal Cordillera // Hydrothermal iron oxide-copper-gold & related deposits: A global perspective / T.M. Porter (Ed.). PGC Publ., Adelaide: Australia. 2002. V. 2. P. 207–226.

74. Neumann J.P., Zhong T., Chang Y.A. The Cu-O (Copper-oxygen) system // Bull. Alloy Phase Diagrams. 1984. V. 5. P. 136–140.
75. Nyström J.O., Henriquez F. Magmatic features of iron ores of the Kiruna type in Chile and Sweden: ore textures and magnetite geochemistry // Econ. Geol. 1994. V. 89. P. 820–839.
76. Nyström J.O., Henriquez F., Naranjo J.A et al. Magnetite spherules in pyroclastic iron ore at El Laco, Chile // Am. Mineralogist. 2016. V. 101. P. 587–595.
77. Ootes L., Snyder D., Davis W.J. et al. A Paleoproterozoic Andean-type iron oxide copper-gold environment, the Great Bear magmatic zone, Northwest Canada // Ore Geol. Rev. 2017. V. 81. P. 123–139.
78. Orberger B., Wagner C., Wirth R. et al. Origin of iron oxide spherules in the banded iron formation of the Bababudan Group, Dharwar Craton, Southern India // J. Asian Earth Sci. 2012. V. 52. P. 31–42.
79. Ovalle J.T., La Cruz N.L., Reich M. et al. Formation of massi-ve iron deposits linked to explosive volcanic eruptions // Sci. Reports. 2018. V. 8. 14855. doi.org/10-1038/s41598-018-33206-3.
80. Ozdemir S., Schulz T., Koeberl C. et al. Early Archean spherule layers from the Barberton Greenstone Belt, South Africa: mineralogy and geochemistry of the spherule beds in the CT3 drill core // Meteoritics & Planet. Sci. 2017. V. 52. P. 2586–2631.
81. Park C.F., Jr. A magnetite «flow» in northern Chile // Econ.Geol. 1961. V. 56. P. 431–436.
82. Perry, D.L. Handbook of Inorganic Compounds. Boca Raton, FL: CRC Press, 1995. 354 p.
83. Philpotts A.R. Compositions of immiscible liquids in volcanic rocks // Contrib. Mineral. Petrol. 1982. V. 80. P. 201–218.
84. Pollard P.J. An intrusion-related origin for Cu-Au mineralization in iron oxide-copper-gold (IOCG) provinces // Mineral. Deposita. 2006. V. 41. P. 179–187.
85. Puffer J.H. Magnetic spherules in Miocene versus Recent Sands of New Jersey // Meteoritics. 1974. V. 9. P. 281–288.
86. Rasmussen B., Koeberl C. Iridium anomalies and shocked quartz in a Late Archean spherule layer from the Pilbara craton: new evidence for a major asteroid impact at 2.63 Ga // Geol. 2004. V. 32. P. 1029–1032.
87. Richards J.P. Post-subduction porphyry Cu-Au and epithermal Au deposits: products of re-melting of subduction-modified lithosphere // Geol. 2009. V. 37. P. 247–250.
88. Richards J.P, Mumin A.H. Magmatic-hydrothermal processes within an evolving Earth: iron oxide-copper-gold and porphyry Cu±Mo±Au deposits // Geol. 2013. V. 41. P. 767–770.
89. Rodriguez-Mustafa M.A., Simon A.C., del Real I. et al. A continuum from iron oxide copper-gold to iron oxide-apatite deposits: evidence from Fe and O stable isotopes and trace element chemistry of magnetite // Econ. Geol. 2020. V. 115. P. 1443–1459.
90. Ruppel M., Lund M.T., Grythe H., Rose et al. Comparison of spheroidal carbonaceous particle data with modeled atmospheric black carbon concentration and deposition and air mass sources in Northern Europe // Advances in Meteorology. 2013. Article 393926. P. 1850–2010. https://doi.org/10.1155/2013/393926
91. Schlegel T.U., Wagner T., Fusswinkel T. Fluorite as indicator mineral in iron oxide-copper-gold systems: explaining the IOCG deposit diversity // Chem. Geol, 2020. V. 548. P. 119674.
92. Sillitoe R.H. Iron oxide-copper-gold deposits: an Andean view // Mineral. Deposita. 2003. V. 38. P. 787–812.
93. Simonson B.M., Glass B.P. Spherule layers – records of ancient impacts // Annual Rev. Earth Planet. Sci. 2004. V. 32. P. 329–361.
94. Storey C.D., Smith M.P. Metal source and tectonic setting of iron oxide-copper-gold (IOCG) deposits: evidence from an in situ Nd isotope study of titanite from Norrboten, Sweden // Ore Geol. Rev. 2017. V. 81. P. 1287–1302.
95. Su Zh.-K., Zhao X.-F., Li X.-Ch et al. Using elemental and boron isotopic compositions of tourmaline to trace fluid evolutions of IOCG systems: the worldclass Dahongshan Fe-Cu deposit in SW China // Chem. Geol. 2016. V. 441. P. 265–279.
96. Sulovsky P. Mineralogy and chemistry of conventional and fluidized bed coal ashes // Bull. Czech Geol. Surv. 2002. V. 77. P. 1–11.
97. Szramek L., Gardner J.E., Hort M. Cooling-induced crystallization of microlite crystals in two basaltic pumice clasts // Am. Mineralogist. 2010. V. 95. P. 503–509.
98. Taran Yu. A., Bernard A., Gavilanes J.-C. et al. Native gold in mineral precipitates from high-temperature volcanic gases of Colima volcano, Mexico // Applied Geochem. 2000. V. 15. P. 337–346.
99. Taylor S., Brownlee D.E. Cosmic spherules in the geologic record // Meteoritics. 1991. V. 26. P. 203–211.
100. Tornos F., Velasco F., Barra F. et al. The Tropezon Cu-Mo-(Au) deposit, Northern Chile: the missing link between IOCG and porphyry copper systems? // Mineral. Deposita. 2010. V. 45. P. 313–321.

101. Tornos F., Velasco F., Hanchar J.M. Iron-rich melts, magmatic magnetite, and superheated hy-drothermal systems: The El Laco deposit, Chile // Geol. 2016. V. 44. P. 427–430.
102. Tornos F., Hanchar J.M., Munizaga R. et al. The role of the subducting slab and melt crystalliza-tion in the formation of magnetite-(apatite) systems, Coastal Cordillera of Chile // Mineral. Deposita. 2020. doi.org/10.1007/s00126-020-00959-9.
103. Troll V.R., Weis F.A., Johnsson E. et al. Global Fe-O isotope correlation reveals magmatic origin of Kiruna-type apatite-iron-oxide ores // Nature Communications. 2019. V. 10. 1712, doi.org/10.1038/s41467-019-09244-4.
104. Van Ginneken M., Foleo L., Perchiazzi N. et al. Meteoric ablation debris from the Transantarctic Mountains: evidence for a Tunguska-like impact over Antarctica ca. 480 ka ago // Earth Planet. Sci. Lett. 2010. V. 293. P. 104–113.
105. Velasco F., Tornos H., Hanchar J.M. Immiscible iron- and silica-rich melts and magnetite geo-chemistry at the El Laco volcano (northern Chile): evidence for a magmatic origin for the mag-netite deposits // Ore Geol. Rev. 2016. V. 79. P. 346–366.
106. Wang K., Chatterton B.D.E. Microspherules in Devonian sediments: origins, geological signifi-cance, and contamination problems // Can. J. Earth Sci. V. 1993. V. 30. P. 1660–1667.
107. Williams P.S., Barton M.D., Johnson D.A. et al. Iron oxide copper-gold deposits: geology, space-time distribution and possible modes of origin // Econ. Geol. 2005. V. 100. P. 371–405.
108. Williams-Jones A.E., Heinrich C.A. Vapor transport of metals and the formation of magmatic-hydrothermal ore deposits // Econ. Geol. 2005. V. 100. P. 1287–1312.
109. Wise J. Gold Recovery, properties and applications. The Netherlands: D. Van Nostrand Company, 1964. 167 p.
110. Wittmann A., Goderis S., Claeys P. et al. Petrology of impactites from El'gygytgyn crater: breccias in ICDP-drill core 1C, glassy impact melt rocks and spherules // Meteoritics & Planet. Sci. 2013. V. 48. P. 1199–1235.
111. Yang H., Xu W., Sorokin A.A. et al. Geochronology and geo-chemistry of Neoproterozoic magmatism in the Bureya Block, Russian Far East: petrogenesis and implications for Rodinia reconstruction // Precambr. Res. 2020. V. 342. 105676.
112. Yoshida H., Hasegawa H., Katsuta N. et al. Fe-oxide concretions formed by interacting car-bonate and acidic waters on Earth and Mars // Sci. Advances. 2018. V. 4. doi:10.1126/sciadv.aau0872.
113. Yudovskaya M.D., Distler V.V., Chaplygin I.V. et al. Gaseous transport and deposition of gold in magmatic fluid: evidence from the active Kudryavy volcano, Kurile Islands // Mineral. Deposita. 2006. V. 40. P. 828–848.
114. Zelenski M., Kamenetsky V.S., Hedenquist J. Gold recycling and enrichment beneath volcanoes: a case study of Tolbachik, Kamchatka // Earth Planet. Sci. Lett. 2016. V. 437. P. 35–46.
115. Zhang H., Shen S., Cao, Ch. et al. Origins of microspherules from the Permian-Triassic boundary event layers in South China // Lithos. 2014. V. 204. P. 246–257.
116. Zhou Jian-Bo, Wilde S. A. The crustal accretion history and tectonic evolution of the NE China segment of the Central Asian Orogenic Belt // Gondwana Res. 2013. V. 23. P. 1365–1377.