

ruffite, erythrite) and Russia (cobaltaustinite, cobaltneustädteite, cobaltsumcorite, le-manskiite, lukrahnite, medenbachite). Unfortunately, these minerals are found in single specimens and their grains are mainly microscopic. The size and beauty of the samples from the Phosphatno-Arsenatnaya vein is unparalleled.

From this report, it is apparent that the Phosphatno-Arsenatnaya vein is of great scientific value. This is primarily due to the discovery of several rare minerals, seven of which represent the first findings in the Russian territory, and one was described as a mineral species totally new for the science. There is no doubt about the importance of specimens from this location for both museums and collectors. In a relatively small area, a large number of high collection-quality mineralogical specimens were found, and for some minerals, world-class specimens were also collected. Therefore, we would like to acknowledge the extremely positive attitude of the management and employees of Prospectors' crew "Poisk" LLC towards the authors of this publication. Staff of the mining company not only informed us promptly about new explosions in the open pit, but also established a protocol that allowed for efficient *in situ* observations, and sampling for scientific research and collections. Unfortunately, at many active mining sites, professional mineralogists and amateurs have no access to the rocks, and often all the valuable research and collection material is lost in the processing plants.

This report has undoubtedly proven that the Phosphatno-Arsenatnaya vein of the Murzinskoe gold deposit is one of the most interesting and productive mineralogical locations in Russia.

Acknowledgments

We express our deepest gratitude to the management of Prospectors' crew "Poisk" LLC and the executive director Vladimir Vladimirovitch Olunin, chief geologist Evgeny Vasilyevich Chugunkov, chief surveyor Nikolai Viktorovich Bail and deputy executive director for regime and preservation of precious metals, Andrei Nikolaevich Korvatko for the opportunity to carry out research and collection of mineral specimens at the active Murzinskoe deposit.

We sincerely thank Igor Viktorovich Pekov for the fruitful discussion of the manuscript and general editorial revision.

We are grateful to Atali A. Agakhanov, Vladislav V. Gurzhiy, Natalia V. Zubkova, Ilya V. Korniyakov, Fabrizio Nestola, Taras L. Panikorovskiy, Igor V. Pekov, Nikita V. Chukanov, and Radek Škoda for their assistance in instrumental study of the minerals, and Ekaterina V. Vorontsova for assistance in photography.

References

Babich V.V., Zadorozhnyi M.V., Gaskov I.V., Akimtsev V.A., Naumov E.A. Murzinskoe deposit is an example of new type of gold mineralization in the North Altai // Current problems of ore formation and metallogeny. International symposium devoted to the academician V.A. Kuznetsov Centenary. Abstracts. Novosibirsk, **2006**, p. 26–28 (*in Russian*)

Bayliss P., Kolitsch U., Nickel E.H., Pring A. Alunite supergroup: recommended nomenclature // Mineralogical Magazine, **2010**, Vol. 74(5), p. 919–927.

Bosi F., Hatert F., Hålenius U., Pasero M., Miyawaki R., Mills S.J. On the application of the IMA-CNMNC dominant-valency rule to complex mineral compositions // Mineralogical Magazine, **2019**, Vol. 83, p. 627–632.

Brusnitsyn A.I., Perova E.N., Loginov E.S., Platonova N.V., Platonova L.A. Lead phosphates (pyromorphite and phosphohedyphane) from the oxidation zone of baryte-lead ores of the Ushkatyn-III deposit, Central Kazakhstan // Zapiski Russian Mineralogical Society, **2023**, no. 2, p. 60–79 (*in Russian*).

Bushmakina A.F., Kobayashv Yu.S. Clinomimetite and arsenbrackebuschite from the Berezhovskoe deposit in the Central Urals // Ural Summer Mineralogical School: Proceedings of All-Russian scientific conference, July 24–28, 1998. Ekaterinburg, **1998**, p. 147–149 (*in Russian*).

Dordević T., Kolitsch U., Nasdala L. A single-crystal X-ray and Raman spectroscopic study of hydrothermally synthesized arsenates and vanadates with the descloizite and adelite structure types // American Mineralogist, **2016**, Vol. 101, p. 1135–1149.

Effenberger H., Krause W., Bernhardt H. J., Martin M. On the symmetry of tsumcorite group minerals based on the new species rappoldite and zincgartrellite // Mineralogical Magazine, **2000**, Vol. 64, p. 1109–1126.

Effenberger H. New investigations of the adelite-descloizite group. 18th General Meeting of the International Mineralogical Association, **2002**, Edinburgh, UK 18, 134–142.

Elliott P., Pring A. Yancowinnaite, a new mineral from the Kintore open cut, Broken Hill, New South Wales // Australian Journal of Mineralogy, **2015**, Vol.17, p. 73–76.

Favreau G., Galéa-Clolus V. Cap Garonne 2014–2024, 10 ans de recherches minéralogiques // Le Cahier des Micromonteurs, **2024**, Vol. 164, № 2, p. 5–176 (*in French*).

Gaskov I.V., Borisenko A.S., Babich V.V., Naumov E.A. The stages and duration of formation of gold mineralization at copper-skarn deposits (Altai–Sayan folded area) // Russian Geology and Geophysics, **2010**. Vol. 51, no. 10, p. 1091–1101 (*in Russian*).

Gusev A.I. Geochemical features of gold mineralization in the Murzinskoe ore field in Mountain Altai // Uspekhi Sovremennogo Estestvoznaniya, **2014**, no. 9, p. 96–100 (*in Russian*).

Gusev A.I., Gusev N.I. The new data on composition of ores and minerals of the Murzinskoe copper-gold deposit, Altai Krai // Izvestiya Altaiskogo Otdeleniya Russkogo Geograficheskogo Obshchestva, **2018**, no. 4, p. 27–36 (*in Russian*).

Gusev A.I., Tabakaeva E.M. Magmatism and mineralization of the Murzinskoe gold field, Mountain Altai // Bulletin of the Tomsk Polytechnic University. Geo Assets Engineering, **2017**. Vol. 328, no. 11, p. 16–29 (*in Russian*).

Kampf A.R., Désor J., Ma C. Karlseifertite, Pb(Ga₂Ge)(AsO₄)₂(OH)₆, a new dusserite-group mineral, from Tsumeb, Namibia // European Journal of Mineralogy, **2024**, Vol. 36, p. 873–878.

Kasatkina A.V. New findings of rare minerals in the Former Soviet Union countries // Mineralogical Almanac, **2019**. Vol. 24, no. 2, p. 4–47.

Kasatkina A.V. New findings of rare minerals from Russia. Part II // Mineralogical Almanac, **2021**. Vol. 26, no. 2, p. 20–58.

Kasatkina A.V., Klopotov K.I., Plášil J. Supergene mineral of Sherlovaya Gora // Mineralogical Almanac, **2014**, Vol. 19, no. 2, p. 94–137.

Kasatkina A.V., Pekov I.V., Škoda R., Chukanov N.V., Nestola F., Agakhanov A.A., Kuznetsov A.M., Koshlyakova N.N., Plášil J., Britvin S.N. Fluoropyromorphite, Pb₅(PO₄)₃F, a new apatite-group mineral from Sukhoviyaz Mountain, Southern Urals, and Tolbachik volcano, Kamchatka // Journal of Geosciences, **2023**, Vol. 68, p. 81–93.

Kasatkina A.V., Tsyganko M.V., Nestola F. Tellurium mineralization of the Priozernoe gold deposit, Northern Urals // Mineralogiya, **2023**. Vol. 3, no. 1, p. 5–22 (*in Russian*).

Kasatkina A.V., Zubkova N.V., Gurzhiy V.V., Škoda R., Nestola F., Agakhanov A.A., Chukanov N.V., Belakovskiy D.I., Všíanský D. Lednevite, Cu[PO₃(OH)]·H₂O, a new mineral from Murzinskoe Au deposit, Altai Krai, Russia // Zapiski Russian Mineralogical Society, **2024**, no. 2, p. 71–88.

Kasatkina A.V., Zubkova N.V., Škoda R., Chukanov N.V., Nestola F., Gurzhiy V.V., Agakhanov A.A., Belakovskiy D.I., Lednev V.S. Stibiosegnitite, IMA 2024-065. CNMNC Newsletter 83 // Mineralogical Magazine, 89, <https://10.1180/mgm.2025.7>.

Khanin D.A., Pekov I.V., Pakunova A.V., Ekimenkova I.A., Yapaskurt V.O. Natural system of fornacite–vauquelinite–embreyite solid solutions and variations in the chemical composition of these minerals at the Ural deposits // Zapiski Russian Mineralogical Society, **2015**, no. 4, p. 36–60 (*in Russian*).