

## ■ CONCLUSIONS

**O**ur research of alkaline pegmatites and vein carbonatites in the Vishneve Mountains district from the Bolshoi Mauk River in the south to the Buldym ultramafic massif and Mt. Mokhnataya in the north covers the period 1982–2020. During preparation of mineralogical review, the materials of predecessors since the late 19<sup>th</sup> century were processed. At the beginning of our works, 149 minerals were known in the veins of the Vishneve Mountains. To date, the list of minerals from alkaline pegmatites, carbonatites, and late mineralization includes 234 mineral species.

During our investigations both incidental and thematic, 85 minerals were identified in the veins of the Vishneve Mountains: aeschynite-(Y), aluminocopiapite, anhydrite, ancylite-(La), ancylite-(Ce), arsenopyrite, atacamite, baddeleyite, bannalsite, baotite, bastnäsäsite-(La), brewsterite-Sr, britholite-(Y), brochantite, burbankite, calkingsite-(Ce), cerianite-(Ce), chabazite-Ca, clinoptilolite-Ca, crichtonite, dawsonite, dingdaohengite-(Ce), donnayite-(Y), fergusonite-(Ce), fergusonite-(Y), ferriallanite-(Ce), ferri-fluoro-katophorite, ferri-fluoro-nyboite, ferri-fluoro-winchite, ferri-katophorite, ferri-nyboite, ferri-winchite, ferro-ferri-winchite, fluorannite, fluorapophyllite-(K), franconite, garronite-Ca, garronite-Na, graphite, grossular, hercynite, hessite, heulandite-K, heulandite-Sr, hisingerite, hollandite, huanghoite-(Ce), hydroxylbastnäsäsite-(Ce), illite, korobitsynite, kukharenkoite-(Ce), loveringite, lucasite-(Ce), maghemite, magnesio-arsvedsonite, magnesio-ferri-hornblende, magnesio-hornblende, malachite, mesolite, millerite, mirabilite, monazite-(La), nenadkevichite, nioboaeschnite-(Y), nosean, parisite-(Ce), pentlandite, perrierite-(Ce), phillipsite-K, posnjakite, pyrophanite, riebeckite, röntgenite-(Ce), rozenite, scheelite, shortite, spessartine, stronalsite, szomolnokite, thénardite, thorutite, trona, vigezzite, yttrialite-(Y), and zirconolite.

Three of these minerals were identified in Russia for the first time: **garronite-Na**, **nioboaeschnite-(Y)**, and **franconite**; seven minerals were found in the Urals for the first time: *huanghoite-(Ce)*, *kukharenkoite-(Ce)*, *perrierite-(Ce)*, *röntgenite-(Ce)*, *thorutite*, *yttrialite-(Y)*, and *zirconolite*.

## ■ ACKNOWLEDGMENTS

**A**uthors thank Ivan I. Mostitsyn and Sergey A. Emel'yanov, general directors of the Vishnevogorsk GOK OAO and Yurii G. Shcherbakov, chief geologist of the Vishnevogorsk mine for the opportunity to study in mining.

We are grateful to all geologists and mineral collectors who provided useful advices and samples for study (their names are given on page 12).

We are cordially grateful to Igor V. Pekov for the reading and editing of the manuscript.

Editorial of *Mineralogical Almanac* and authors thank museums and collectors for their permission to photograph specimens in their collection and assistance in photo session:

*Fersman Mineralogical Museum, Russian Academy of Sciences (Moscow):*  
P.Yu. Plechov, N.A. Mokhova, and A.O. Karpov;

*Vernadsky State Geological Museum, Russian Academy of Sciences (Moscow):*  
S.V. Cherkasov, I.A. Starodubtseva, Z.A. Bessudnova, and I.P. Andreeva;

*Ural Geological Museum, Ural State Mining University (Ekaterinburg):*  
D.A. Kleimenov;

*Planeta Museum, (Ekaterinburg):*  
V.A. Medvedev and V.I. Ermolenko;

*Natural Science Museum, Ilmeny State Reserve (Miass):*  
M.A. Rassomakhin;

*Mineral collectors:* N.B. Belenkov, A.V. Donskov, S.G. Epanchintsev, A.V. Ivonin, S.V. Kolisnichenko, V.A. Pelepenko, and I.A. Tkachenko;

also M.S. Zorin (project "Ural Mines"), V.G. Dyatlov, and J.-C. Boulliard, curator of mineral collection at the Pierre and Marie Curie University (Paris, France) for kind permission to use their photos in this publication.