

THE REVIEW ON FERSMAN MINERALOGICAL MUSEUM ACQUISITIONS IN 2006–2008

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1337 new mineral specimens were catalogued into main inventory of Fersman Mineralogical Museum RAS in 2006–2008. Those specimens represented by 580 mineral species from 66 countries and from ocean floor and space as well. Among them 200 species are new for Museum collections including 50 species that were discovered during this period. Fifteen of those species were discovered with participation of Museum staff members. Of the species obtained 61 represented by type specimens, cotypes or their fragments. By the end of 2008 the number of valid mineral species in Museum reached 3200. Of the newly acquired items 792 (60%) were donated by 150 persons and by 6 organisations (including about 4.5% obtained as type specimens); 95 specimens (7%) were purchased; 261 (20%) were exchanged and — 157 (about 12%) were collected by Museum staff. Other types of acquisitions are about 1%. A review of new acquisitions classified by mineral species, geography, it's types and sources. The list of new species for Museum given in attachment.

2 tables, 18 photos, 1 appendix.

Keywords: mineralogical museum, collection of minerals, new acquisitions, mineral species, type specimen, cotype specimen.

A total of 1337 new specimens were introduced into Museum's inventory between 2006 and 2008 into. The main part — 834 items were catalogued into systematic collection; 240 — into locality collection, 144 — into pseudo-morph collection, 41 — into collection of crystals and 78 became a part of gem collection.

More than 75% of items were both catalogued and acquired during 2006–2008. The rest of them were acquired earlier but were required mineral identification, conservation etc. and since were catalogued during that period.

About 60 % (792) of new items were donated by 150 persons and 6 organizations. Those numbers include also 4,5% specimens provided as type specimens for recently discovered mineral species. Twenty percent (261) of mineral specimens were exchanged with museums and private mineral collectors. Seven percent of new specimens (157) were purchased and about 12% (160) — were collected by Museum staff. Other types of acquisitions were accounted less then 1%. This review only includes the data on items already included into main inventory at indicated period. The specimens that at the end of 2008, had not been completely processed and assigned to the main collections are not included in this review.

New acquisitions classified by mineral species

The mineral specimens catalogued into Museum's main inventory are represented by 580 valid mineral species, 200 of which are new species for Museum (listed in appendix 1). Sixty one of those species are represented by type specimens, cotypes or fragments of type specimens. Fifteen of those species were discovered by Museum staff or in collaboration with Museum staff. Out of about 200 new mineral species approved in 2006–2008 by Commission on New Minerals, Nomenclature and Classification of International Mineralogical Association (CNMNC IMA) Museum was able to acquire 50 species. Thus as of December 31 2008 the number of mineral species at Fersman Mineralogical Museum RAS (counting new and discounting some old species presence of which in collection was not confirmed by scientific study) appeared to be 3200.

Of the 580 recently acquired mineral species the majority (396) are represented by a single specimen. Eighty species represented by 2 specimens. Three to five specimens represent each of 55 mineral species; 33 species represented by 6–10 specimens and 16 — by more the 10 specimens. (Table 1). Two specimens contain a few

Table 1. Mineral species by the number of acquired specimens (for more than 5 specimens)

1. Quartz	95	15. Realgar	10	29. Copper	7
2. Elbaite	26	16. Staurolite	10	30. Forsterite	7
3. Calcite	19	17. Gibbsite	9	31. Chalcopyrite	7
4. Goethite	18	18. Orthoclase	9	32. Wollastonite	6
5. Safflorite	17	19. Baryte	8	33. Gersdorffite	6
6. Skutterudite	17	20. Wulfenite	8	34. Corundum	6
7. Lepidolite	16	21. Hematite	8	35. Lazurite	6
8. Clinocllore	15	22. Kyanite	8	36. Loellingite	6
9. Fluorite	13	23. Magnetite	8	37. Polyolithionite	6
10. Beryl	11	24. Moganite	8	38. Siderite	6
11. Willemite	11	25. Sphalerite	8	39. Fluorapatite	6
12. Gypsum	11	26. Galena	7	40. Spinel	6
13. Zinnwaldite	11	27. Diopside	7	41. Epidote	6
14. Pyrope	10	28. Ilmenite	7		

new species for Museum. The review below given in the order corresponding generally to the Table 1.

Quartz and it's varieties came from 23 different deposits or other locations. A big number of quartz specimens as well as of goethite ones were collected well ago in 1984 by Museum staff (D.V. Abramov, D.A. Romanov, A.B. Nikiforov, T.M. Pavlova) at Tauchik, Mangyshlak Peninsula, West Kazakhstan. Thirty seven specimens were catalogued from that location. They are very diffent by color from colorless to chocolate-brown and red with very contrast color zona-

tion and zonal distributions of **goethite**, hematite and lepidocrocite inclusions. Zonation and inclusions looks very attractive on polished specimens.

Another portion of quartz specimens is from Dashkesan, Azerbaijan. Those are mostly splitted quartz crystals and their intergrowth collected in 2008. Part of them collected by M.M. Moiseev another part donated by A.O. Agafonov. The central parts of crystals have very pale amethyst color. Often crystal intergrowth reminding Japanese twins. The angle very seems to be very close to 90°, however it is impossible to measure



Photo 1. Amethyst druse Size 18 cm. Borosilikatnoe deposit, Dalnegorsk, Primorsky Kray, Russia. Exchange. Cat. No 92728.

Photo 2. Amethyst sceptre. Size 5 cm. Zimmermanovka village, Khabarovsk Kray, Russia. Purshase. Cat. No OP2422.

Photo N.A. Pekova





Photo 3. Amethyst. «Three head» geode. Height 93 cm. Weight 164 kg. Cristal do Sul, Rio Grande do Sul, Brazil. Donated by D.I. Belakovskiy. Cat. No 92350.

Photo 4. Moganite-chalcedony geode. Size 9 cm. Sierra Madre, Chihuahua, Mexico. Donated by D.I. Belakovskiy. Cat. No OP2397.

Photo N.A. Pekova

it exactly due to crystals splitting. In spite of it is very common case still unclear are they really twins.

Among others it's worth to mention three "heads" amethyst geode from Brazil about 1m tall 164 kg by weight donated by D.I. Belakovskiy (photo 3). We can't say it's a big size for this kind geods but three "head" composition is not too common. Amethyst crystals inside are up to 3 cm and have good dark color.

There were acquired also a few Russian amethyst. One of them is a nice druse of crystals up to 14 cm in size from Borosilikatnoe deposit in Dalnegorsk, Primorsky Kray (photo 1). Another one is a scepter crystal from relatively new location Zimmermanovka in Khabarovsk Kray (photo 2).

Interesting specimen from Ganesh Himal, Nepal — the druse of spindle-like quartz crystals up to 5 cm colored to green by chlorite inclusions was donated by O.A. Lopatkin.

Among quartz varieties represented by different types of chalcedony it's worth to mention big (about 30 cm) attractive lithophyse with agate from Rio Grande do Sul, Brazil donated by

D.V. Abramov and D.A. Ryabukhin. An interesting agate from limestone near Golutvin, Moscow region gifted to Museum by A. Levin. By exchange there were obtained a few big spheres partly hollow inside made out of agate from the same locality. Those were assigned to gem collection along with a few landscape agates from Idzhevan, Armenia. Last ones were donated by A.N. Korobkov and framed by him into a metal to highlight the nature's art. A set of caboshons from mohs agate from Pstan in Kazakhstan was also catalogued into gem collection. Very morphologically attractive are the **moganite** containing chalcedony secretions from rhyolites of Sierra Madre, Chihuahua, Mexico (photo 4). They amplify the diversity of similar material ealier obtained by Museum from Mongolia and from New Mexico, USA.

The most and more interesting part of **elbaite** specimens (15 out of 26) represented by polished cross sections of zonal and sectorial elbaite crystals from Malkhan Range, Transbaikai, Russia (photo 5 and 6). Bright-pink splitted elbaite crystals in association with amazonite from new spots at Minh Tien mine, Luc Yen, Vietnam donated

Photo 5. Elbaite. Polished cross sections of zonal crystals. Size 3–5 cm. Malkhan Range, Transbaikial, Russia. Purchase. Cat. No OP2406 – 2416; OP 2419 – 2421. Purchase.

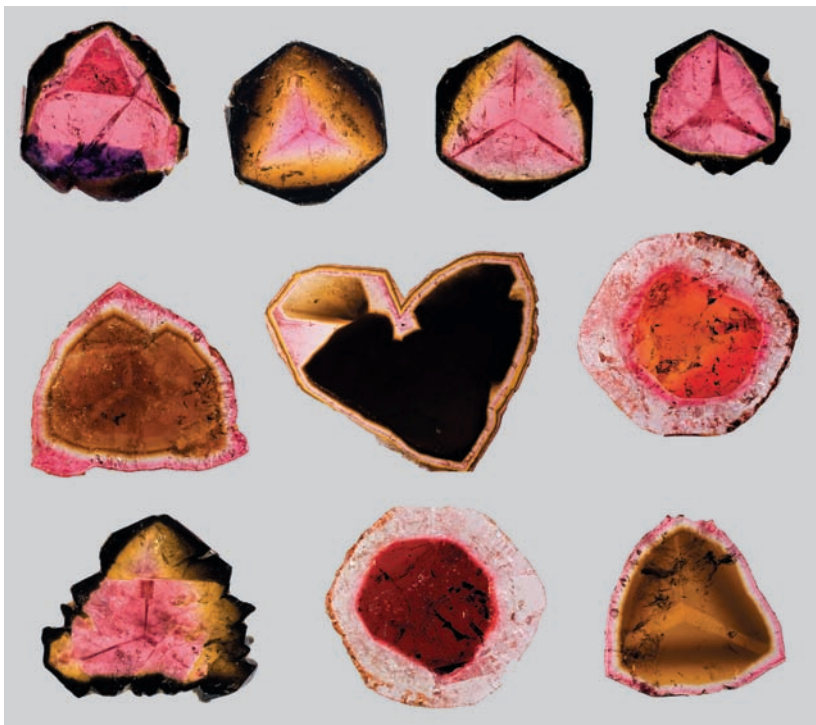


Photo N.A. Pekova

by J.E. Patterson. Pale-pink elbaite from Wama, Pech valley, Nuristan, Afganistan and zonal double terminated floaters from Stak Nala, Afganistan donated by F. Wafi and D.I. Belakovskiy.

Out of 19 **calcite** specimens acquired about one half collected at above mentioned locality at Mangyshlak Peninsula. Those are spherulites and spherulites crusts very interesting by it's morphology. A few calcite twins came from Dashkesan, Azerbaijan. Rather attractive are scalenohedra calcite crystals inside Mercenaria Dermagna shell from Fort Drum, Florida, US (photo 7).

Significant number of new **safflorite**, **skutterudite** as well as **gersdorffite** and **loellingite**

specimens related to extensive collection characterizing mineralogy of Co deposits donated by R.A. Vinogradova. This collection mostly represents Bou Azzer ore field in Morocco but also includes material from Khovu-Aksy deposit in Tuva, from a number of Co deposits in Czech Republic and Slovakia and from some other deposit. The collection accompanied with analytical information on donated minerals and geological data on those deposits and has a significant scientific value.

Lepidolite and **zinnwaldite** (16 and 11 specimens accordingly) are part of collection of mica group minerals donated by T.N. Shuriga. This collection also includes **polyolithionite** and protolithionite from different deposits. All speci-

Photo 6. Elbaite. Polished cross sections of zonal and sectorial crystals. Size 4 cm. Malkhan Range, Transbaikial, Russia. Purchase. Cat. No OP2417 and OP2418.



mens of that collection came with detail data on it's composition, polytypes, physical properties. This is a main value of that collection.

The new and very attractive stuff came in the end of 2008 from Korshunovskoe deposit near town Zheleznogorsk, Irkutskaya Oblast', Siberia, Russia. This is complete cross sections of **clinochlore** pseudostalactites and groups of 2, 3 or even 5 pseudostalactites. With a small hollow channels in their centers (photo 8). On a current moment this is probably the best by quality and size material that kind ever mined from that deposit for about 45 years of it's exploration. Specimens are obtained as gift of D.I. Belakovskiy.

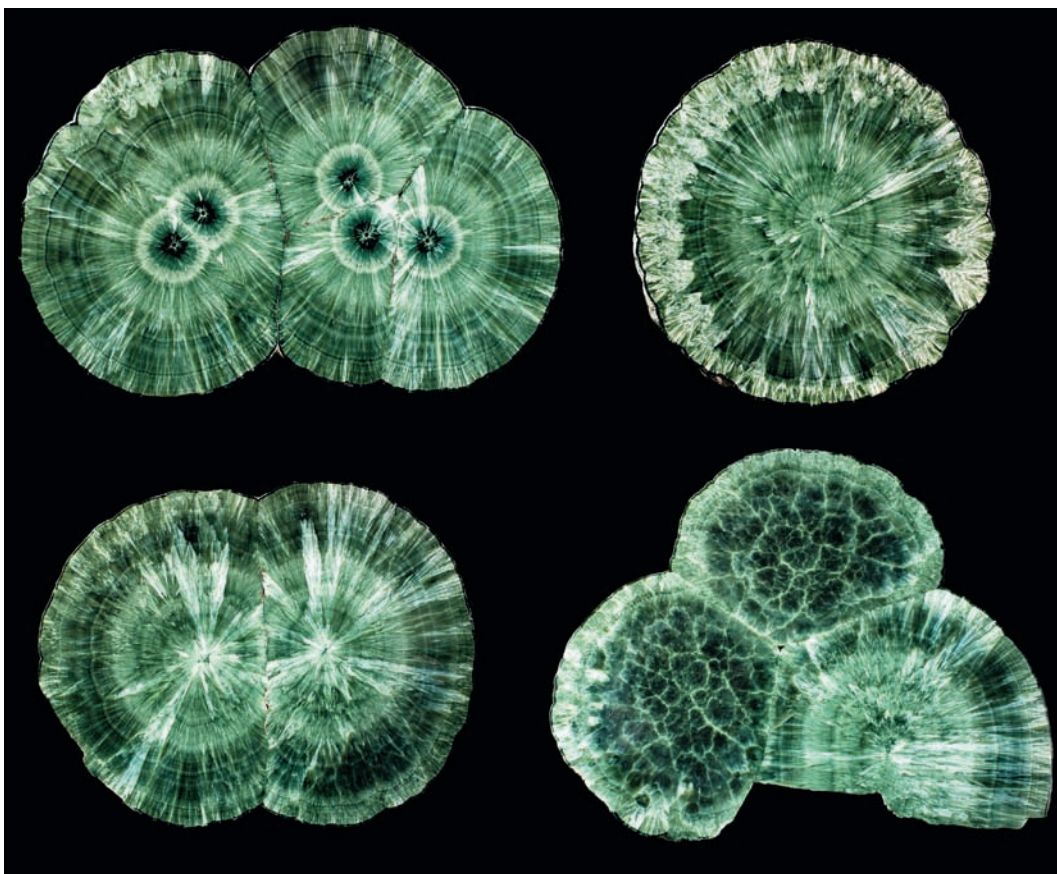
Among **fluorite** specimens (13) most attractive are druses of transparent green cubic crystals and also druse of green fluorite octahedrons with purple coloration near it's edges from



Photo 7. Calcite. Druse inside the shell of *Mercenaria Dermagna*. Size 9 cm, Ruck's pit, Tamiami formation, Florida, USA. Exchange. Cat. No OP2339.

Photo N.A. Pekova.

Photo 8. Clinochlore. Pseudostalactite's polished cross sections.. Korshunovsky mine near Zheleznogorsk, Angaro-Ilimsky region, Irkutskaya oblast', Siberia, Russia. Donated by D.I. Belakovskiy. Upper left – size 25 cm. Cat. No OP 2475; Upper right – size 15 cm. Cat. No 92736; Bottom left – size 18 cm. Cat. No OP 2473. Bottom right – size 19 cm. Cat. No OP2471.



Shangrao, Jiangxi Province, China. Another decent specimen is unusually blue fluorite spherulite fragment from Dongjiang, Inner Mongolia, China. It's also worth to mention blue zonal cubic fluorite crystals with sphalerite and barite from Elmwood, Smith Co., Tennessee, USA.

Out of 11 catalogued **beryl** specimens decent are prismatic aquamarine about 10 cm in size from Shigar Valley, Pakistan; greenish-yellow partly transparent crystals with very noticeable channels from Kalba Range in East Kazakhstan obtained from V.L. Barsukov through E.L. Sokolova. Besides that a few faceted stones — two aquamarine and one heliodor from Thach Khoan, Vietnam, were donated by J.E. Patterson and directed to gem collection.

As well as a beryl **willemite**, **gypsum** and **zinnwaldite** (see above) obtained by 11 specimens of each. All **willemite** samples came from Sterling Hill Mine, New Jersey, USA. Those and some **wollastonite** specimens from the same location appeared to be a good addition for Museum fluorescent exhibit. Among gypsum specimens recognized are classical "desert rose" from Algeria donated by M. Monzer and fragments of giant transparent crystals with sulphur crystals inclusions from Debar deposit in Macedonia collected by Museum staff in 2007.

All new **pyrope** specimens are from different kimberlite pipes of Yakutia and Arkhangelskaya Oblast', Russia. The biggest are bright red grains up to 3 cm associated with peridot and Cr-diopside. Some specimens are polished plates thin enough to see translucence of those minerals. Those obtained to improve exposition "Minerals of upper mantle". Exemplars of **forsterite**,

ilmenite, **diopside** donated by A.I. Ponomarenko and E.M. Verichev for the same reason and from the same localities.

Massive red aggregates of **realgar** which are hardly recognizable from cinnabar by color were collected by Museum staff from landslide outcrop near Alchar deposit in Macedonia in 2007. The druse of columnar bright red realgar crystals from new location at Baya Sprie, Romania was donated by V. Breckler. None of 10 catalogued staurolites this time came from traditional Museum **staurolite** source at Semiostroviye, Keyvy. V.V. Levitsky donated a few selfcollected specimens from other (new) locations in Keyvy, Kola Peninsula and from Hit-ostrov, Karelia. N. Gospodinov gifted nice typical X-cross twin from muscovite schists near Topolovgrad, Bulgaria. A series of penetrating twins by (031) and (231) (so called X-crosses and right crosses accordingly) from Taos vicinities in New Mexico, USA were exchanged.

The preparation Museum exhibit on hypergenesis processes had required obtaining of **gibbsite** specimens. A.D. Slukin and B.A. Bogatyrev provided those from different deposits in Russia, Kazakhstan, India.

New **orthoclase** acquisitions are represented by "noble" amazonite from Minh Tien mine, Luc Yen, Yenbai, Vietnam. There are a few big pieces with amazonite crystals with transparent zones and saturated green color amazonite cabochons and faceted stones donated by J.E. Patterson. Such color and transparency of those stones are rather unusual and could easily get someone confused. From the same locality and source a few specimens with bright red octahedral of **spinel** in marble were obtained.

The new intergrowth of flat nearly colorless **barite** crystals came from Cerro Waihuyn Miraflores, Peru. Most attractive among **wulfenite** specimens are a few from old classic Red Cloud mine, La Paz Co., Arizona, USA with orange-red platy crystals up to 2 cm (photo 9).

A new portion of very attractive **hematite** pseudomorphs after magnetite crystals up to 8 cm from Payun Matru Volcano, Mendoza, Argentina donated by D.I. Belakovskiy were a good addition to previously obtained and show the diversity of hopper crystals. It's good to know finally more exact location for that material which was a secret some time ago.

Kyanite specimens were collected by Museum staff in Kovdor, Kola Peninsula, Russia

Photo 9. Wulfenite. Platy crystal 2 cm in size. Red Cloud mine, Trigo Mts., La Paz Co., Arizona, USA. Exchange. Fragment of specimens. Cat. No 92712. Photo N.A. Pekova.





Photo 10. Corundum. Spindle-like crystal. Size 11 cm. Gwinea. Donated by A.V. Surkov. Cat. No 92288.

Photo 11. Galena with sphalerite. Size 14 cm. Osikovo, Madan, East Rhodopes, Bulgaria. Purchase. Cat. No 92564.

Photo N.A. Pekova.

(M.M. Moiseev) and near Prilep city in Macedonia (N.A. Mokhova, S.N. Nenasheva)

The druses of **magnetite** rhombododecahedrons crystals up to 2 cm in size belongs to above mentioned acquisitions from Dashkesan, Azerbaijan as well as tetrahedrons of **chalcopyrite** up to 4 cm covered with dark blue films of covellite and druses of splitted epidote. Most part of that portion donated by A.O. Agafonov.

The large specimen with **sphalerite** crystals up to 6 cm edged by combination of two tetrahedral from Dalnegorsk was donated by B.Z. Kantor. An interesting sphalerite from Pierrepont, St. Lawrence Co., New York, USA with very bright orange fluorescence both in long and short diapazones of UV waves was obtained as a gift of geologist William deLorraine. An attractive blocky crystals of sphalerite associated with zonal fluorite from Elmwood, Smith Co., Tennessee, USA were exchanged.

There are two nice druses among **galena** from Bulgaria. One — contains flattened by [100] crystals up to 5 cm with cross-like intergrowth from Osikovo, Madan, Eastern Rhodopes (photo 11). Another one with penetrated crystals twined by (111) from Angel Yanakiev mine,

Rhodopes. An interesting specimen with galena overgrowing pyrrhotite crystal from Nikolaevsky mine, Dalnegorsk, Far East of Russia was donated by V.V. Ponomarenko.

Two **corundum** specimens are more remarkable among six obtained: greyish-blue crystal more than 9 cm in size from Cape Budun, Olkhon Island, Lake Baikal, Russia (gift of I.A. Tkacheko) and spindle shape crystal of red corundum about 11 cm long (photo 10) from Gwinea donated by A.V. Surkov.

Bright blue and rather big for Malo-Byst-rinskoe deposit (near Lake Baikal, Russia) **lazu-rite** crystals were donated by V.V. Tkachenko.

The most unusual **siderite** acquisitions represented by new material from Nikolaevsky mine, Dalnegorsk, Russia. Those are represented by spheroidal or egg shape aggregates empty inside associated with calcite and pyrite (donated by V.V. Ponomarenko). The genesis of this kind shape remains unclear so far.

At the end of that review part we have to mention a beautiful faceted yellow-green fluorapatite of triangle shape with triangle side about 2 cm. This was faceted for Museum by A.N. Timofeev out of a glass looking splitter found during sorting of an old training material.

Table 2. New acquisitions by countries of the world

1. Russia	457	24. China	12	47. Georgia	2
2. USA	120	25. Brazil	11	48. Denmark	2
3. Kazakhstan	112	26. Sierra-Leone	10	49. Israel	2
4. Morocco	58	27. Austria	9	50. Cape Verde	2
5. Germany	29	28. Slovakia	9	51. Madagascar	2
6. Sweden	29	29. Australia	7	52. Peru	2
7. Japan	29	30. Kyrgyzstan	7	53. Portugal	2
8. Azerbaijan	28	31. Namibia	7	54. France	2
9. Tajikistan	28	32. Argentine	6	55. Algeria	1
10. Finland	26	33. Afghanistan	6	56. Hungary	1
11. Macedonia	25	34. Bolivia	6	57. Dominican Rep.	1
12. Italy	24	35. Chile	6	58. Libya	1
13. Great Britain	23	36. Greece	5	59. Malawi	1
14. Rep. South Africa	23	37. Congo DR	5	60. Nepal	1
15. Bulgaria	20	38. Belgium	4	61. Nigeria	1
16. Mexico	20	39. Egypt	4	62. Poland	1
17. Vietnam	17	40. Spain	4	63. Romania	1
18. India	15	41. Mali	4	64. Turkmenistan	1
19. Canada	15	42. Myanmar	4	65. Switzerland	1
20. Ukraine	15	43. Armenia	3	66. Ethiopia	1
21. Norway	13	44. Belarus	3		
22. Czech Republic	13	45. Tanzania	3		
23. Pakistan	13	46. Gwinea	2		

Seven specimens came from the bottom of Atlantic, Pacific, Indian and Arctic oceans; two specimen from Space; seven — are synthetic materials and for three specimens locality unknown.

Unfortunately there were no data on locality of that piece.

New acquisitions classified by geography

Obtained mineral specimens originated from 66 countries of the world, ocean's bottom, space, human laboratories (Table. 2).

Russia

Kola Peninsula. As usual most of Russian recent acquisitions are from that area. This time 108 specimens (78 mineral species) added. By the main Kola Peninsula objects it's distributed this way: **Khibiny massif** — 48 (33), **Lovozero massif** — 27 (23), **Kovdor** — 12 (10), **Keyvy** — 12 (8).

The most scientifically valuable acquisitions from **Khibiny massif** are type specimens (or their parts) of ten discovered here new mineral species (middendorfite, fluorcalciobriholite, tsepinite-Na, labyrinthite, wilhelmsramsayite, georgbarsanovite, nechelyustovite, andrianovite, armbrusterite, podlesnoite), and also other speci-

mens of newly discovered species — ivanyukite-Na and ivanyukite-K. Besides that the diversity of minerals from Khibiny amplified with lucasite-(Ce), orickite, chlorbartonite. We have to mention new finds of megacyclite and kostylevite (in crystals) much better by quality compare to earlier found stuff and also cuboctahedral crystal of villiaumite about 1 cm in size from Koashva mine. A few items curved out astrophyllite and again villiaumite were good enough to add it to gem collection. The most part of specimens from Khibiny donated by I.V. Pekov and A.P. Khomyakov.

Among type specimens — there are six recently discovered from **Lovozero massif** — chesnokovite, dualite, pautovite, gjerdingenite-Ca, caryochroite. Species diversity was supplemented with punkaruavite, adamsite-(Y), gobbinsite, bykovaite, eirikite. Specimens were donated by I.V. Pekov, A.P. Khomyakov, V.G. Grishin, P.M. Kartashov, V.V. Levitsky. Petko M. Petrov and Mikhail N. Maleev — colleagues from Bulgarian National Museum "Earth and Men" (Sofia) donated to the Museum manganbelyankinite that they found during

expedition to Kola Peninsula deposits in 2008. Surprisingly it turned out to be the new mineral species for the Museum. Also, number of specimens supplemented species diversity of Palitra pegmatite, Lovozero massif.

Three new mineral species from **Kovdor** were catalogued. These are: golyashevite, mogovidite and phosphoinnelite. Karchevskyite type specimen was received from the author, S.N. Britvin. The other grantors are I.V. Pekov and N.V. Chukanov.

Amongst the acquisitions from **Keyvy** it is worthwhile to mention spectacular intergrowth of three crystals of almandine; the biggest one of which is approximately 12 cm across (Makzabak). Another almandine crystals combination from Takhlintuaiv Mt. was donated by B.B. Shkursky. The most interesting among the new found material are massive coarse-grained tveitite-(Y) and staurolite from new localities, mentioned above.

Karelia (14 specimens, 14 mineral species). Among them there is one type specimen — malyshevite from Srednyaya Padma deposit. The majority of other specimens represent mineral associations of Vuorijarvi massif.

From European part of Russia south of Karelia and west of Ural foothills also 14 specimens obtained. Those represented by 7 species among which three are newly described. Chukanovite and droninoite are terrestrial minerals but were formed by weathering of Dronino meteorite found in Kasimov region. Third one is lakargiite from Lakargi Mt., Kabardino-Balkaria, North Caucasus. The recently "rehabilitated" species calico-olivine also came from that locality. The grantors are: A.E. Zadov, E.V. Galuskin, I. Galuskina, V.Gazeev, N.N. Pertsev.

Ural: There are 50 specimens (40 species) are obtained from Ural Mts. The most attractive is probably the one with long subparallel golden millerite needles in calcite from Saranovskoe deposit. Very good (probably best of species) specimen of polyakovite-(Ce) from Ilmeny, South Ural donated by S.V. Kolisnichenko. Prismatic colorless euclase crystal about 3 cm in size was first from Emerald mines. Euclase was found at that location recently. Two type specimens were catalogued: fluorellestadite and potassic-ferri-magnesiosadanagaite. A series of PGM rare minerals — rhodarsenide, palladodymite, polkanovite were donated by S.N. Britvin. Those are grains a several dozen of

micromerers in size in epoxy microprobe mounts. They came with an analytical data and images in backscattered electrons. Delafossite from Uchaly deposit (South Ural), vernadite and other manganese containing minerals were catalogued after processing and study of working materials collected by P.F. Andrushchenko and A.T. Suslov. It's worth to mention yellow platy stolzite crystal about 0.5 cm from Pelengichey 2 near Zhelannoe deposit (North Ural) granted by M.M. Moiseev and thortveitite inclusions in quartz from Astafievskoe deposit (South Ural).

The most interesting acquisitions from **Altay Mts.** (6) are outstanding dendritic aggregates of native copper crystals which individuals are up to 1.5 cm across. This is new material recently found at Rubtsovskoe deposit, near Rubtsovsk town (Photo 12).

Krasnoyarsky kray (11 specimens, 9 mineral species). One of the new mineral species is ferroskutterudite, found in Komsomolsky mine in Norilsk ore-field. Dendritic löllingite aggregates and okenite spherulites from the same locality

*Photo 12. Copper. Dendrite. Size 7 cm.
Rubtsovskoe deposit near Rubtsovsk, Altay Mts., Russia.
Exchange. Cat. No 92732.
Photo N.A. Pekova*



were donated by E.M. Spiridonov. Rather good octahedral pyrochlore crystal 7 cm in size from Tatarka river, Eniseysky Ridge, was purchased in 2007 at the auction held in Colorado Mining School (Golden, Colorado, USA).

Baikal, Transbaikial regions and Irkutskaya oblast'. These regions supplied 107 specimens (35 mineral species) altogether. Catalogued type specimens are batisivite, dovyrenite and tounkite. Interesting material arrived from deposits near Zheleznogorsk town, Angaro-Ilimsky, Irkutskaya region. Besides above mentioned various clinocllore from Korshunovskoe deposit there are giant (up to 9 cm) splitted white hydrotalcite crystals from Rudnogorskoe deposit. Materials from Yoko-Dovyrensky massif donated by A.E. Zadov and N.N. Pertsev, were supplemented, apart of dovyrenite, with jennite, suolunite and plombierite. Specimens with manganbabingtonite crystals from Krasnokamensk group of skarn deposits of Eastern Sayan Mts. were donated by R.A. Vinogradova. Good quality eudidymite and helvite specimens from Ermakovskoe deposit were donated by I.I. Kupriyanova and E.P. Shpanov. Significant number of specimens from lithium-mica collection studied, originate from Vishnyakovskoe and Alexandrovskoe deposits, between Tagul and Biryusa rivers, Eastern Sayan Mts. and from Orlovskoe deposit, Transbaikial. The zonal cross-sections of elbaite crystals from Malkhan and lazurite from Malobystrinskoe deposit were mentioned above.

Photo 13. Hedenbergite-wollastonite skarn. Borosilikatnoe deposit, Dalnegorsk, Primorsky Kray, Russia. Polished plate. Size 25 cm. Exchange. Cat. No PDK8081. Photo N.A. Pekova.



The greatest part of 11 arrived specimens from **Tuva** are represented by skutterudite, safflorite and nickeline from Khovu-Aksy deposit, donated by Raisa A. Vinogradova; also type specimens of karasugite were catalogued.

The largest part of acquisitions from **Yakutia** (55 specimens, 29 mineral species) is represented by kimberlite minerals. Apart of rock-forming and accessory minerals these are moissanite, rutile, djerfisherite, rasvumite, nyerereite, troilite, kyanite. Type specimens from Yakutia are the following: hydroxylborite, aqualite, mangazeite, rudenkoite. Another rare minerals such as pertsevite from Snezhnoe deposit, aluminomagnesiophulsite (Tas-Khayakhtakh Ridge, Verkhoyanye), allabogdanite from Onello meteorite and miassite from Aldan river placers, also should be mentioned.

Khabarovskiy Kray (9 specimens, 4 mineral species). Two isoferroplatinum cubic crystals from Kondor massif were obtained. One of them, 0.5 cm across, is a fluorite type twin naturally decorated with gold. There was no such a material in the Museum before, although many foreign museums own it. A sceptre shape amethyst from Zimmermanovka was mentioned above.

The most part of 22 specimens (12 mineral species) from **Primorsky Kray** is from Dalnegorsk town area deposits. Besides amethyst druse, sphalerite and siderite aggregates discussed earlier, one of the noticeable specimens is native arsenic nodule fragment, up to 11 cm across from Borosilikatnoe deposit open pit, donated by Yuri Pustov. Polished "scenery" hedenbergite-wollastonite skarn plate was recorded to the collection of gems (photo 13). Bournonite crystal from 2nd Sovetsky mine was donated by V.N. Kalachev. Minerals from other areas within Primorsky Kray to be mentioned are: kimuraite-(Y), lantanite-(Nd) from Abramovskoe, donated by V.V. Seredin.

Chukotka (9 specimens, 4 mineral species). The most interesting new for the Museum mineral haxonite, detected in Egvekinot meteorite and donated by S.N. Britvin.

Kamchatka and Kuril Islands (23 specimens, 18 mineral species). Besides uncommonly terminated pyrite and molybdenite crystals from Lastochka deposit, the upper reaches of Ayanka river (donated by I.M. Mertsalov), all other specimens originate from Tolbachik, Mutnovsky (Kamchatka) and Kudryavy (Iturup Island) volcanic fumarolic sublimates.

Amongst them there are type specimen of abramovite and recently discovered tazieffite (named after well-known volcanologist) A series of rare minerals from Tolbachik volcano: urusovite, leningradite, atlasovite, georgbokiite etc. — were donated by well-known volcanist and mineralogist L.P. Vergasova. The new found of kudriavite from Mutnovsky volcano, donated by G.P. Ponomarev is more impressive and presentable than that from the type-locality at Kudryavy volcano.

It is significant to mention an individual remarkable donation made by O.I. Kotlyar. This is a large fragment of Seymchan meteorite cut from one side, over 400 kg and approximately 90 x 55 x 33 cm in size (photo. 14). The change from iron octahedrite to pallasite is clearly visible on the cut surface, as well as elongated schreibersite crystals. This meteorite fragment was found during recent expeditions near Seymchan, Magadan region and is extremely valuable donation to the Museum.

CIS (former USSR republics)

Kazakhstan (112). The overwhelming number of acquisitions from this country are previously mentioned minerals collected near Tauchik, Mangyshlak; and also landscape moss agates from Pstan. Amongst rare minerals there are chistyakovaite and uramarsite type specimen, and recently discovered new mineral phosphedyphane, found in old specimens from Ken-Choku.

Azerbaijan (28). Almost all the acquisitions were received from collecting trip held in 2008 to Dashkesan iron-ore deposit (described earlier), except rare mineral species niningerite, rudashovskiite and schoellhornite found in Indarkh meteorite fell near Shusha village in 1891 (S.N. Britvin donation).

Tajikistan (28). Amongst new 'arrivals' there are type specimens of new minerals from Darai-Pioz massif: zeravshanite, pekovite, senkevichite, sokolovaite, faizievite and nalivkinite discovered by Museum researchers L.A. Pautov, A.A. Agakhanov, V.Yu. Karpenko and also zirsilite-(Ce) and carbokentbrooksite donated by A.P. Khomyakov. Besides, the specimens earlier collected from Tro canyon, Zeravshan Range were catalogued.

Ukraine (15). The most interesting specimens with black tabular groutite crystals up to



Photo 14. Seymchan meteorite (fragment). Size 90 cm. Weight > 400kg. Donated by O.I. Kotlyar. Photo N.A. Pekova.

1 cm in size and also cubic magnetite crystals from Zavalyevsky graphite deposit, Kirovogradskaya oblast'. These were collected and donated by I.V. Pekov and V.V. Levitsky.

Kyrgyzstan (7). The new found of nevadaite from Hodzha Rushnoy mazar locality, Batkenskaya oblast', was determined and donated by V.Yu. Karpenko.

Armenia (3). The whole lot is landscape moss agates from Idjevan donated by A.N. Korobkov and mentioned above.

Belarus (3): chromite, merrillite and stanfieldite from Bragin meteorite donated by S.N. Britvin and M.M. Moiseev.

Both specimens from **Georgia** are represented with braunite together with other manganese oxides from Chiatura deposit. The only specimen from **Turkmenistan** is a sphere made of calcite onyx from one of Karlyuk caves and catalogued into gemstone collection.

Other countries

The **USA** ranks next to Russia in the total number of mineral specimen acquisitions (120 specimens, of which 87 are separate mineral species from 24 states); specimens are predominantly from New Jersey (21), California (17) and Arizona (14). Specimens of wulfenite, fluorite, sphalerite, staurolite and willemite from the USA were already mentioned before in this paper. The greater part of these acquisitions is represented by rare mineral species — mostly pegmatitic phosphates from different states. The most significant are type specimen of ferromerrillite from Los Angeles meteorite discovered by S.N. Britvin, and fragment of a type specimen of samarskite-(Yb) donated by M. Origlieri.

Morocco (58). All the acquisitions are from Bou-Azzer ore-mining region and belong to the above mentioned collection donated by R.A. Vinogradova.

The museum received 29 specimens from each **Germany, Sweden and Japan**. Mainly they are rare minerals many of which are new for the Museum. Among them there is britvinite type specimen, discovered by Russians from Longban deposit in Sweden.

The most interesting among the new acquisitions from **Finland** (26) are tochilinite and haapalaite crystals from Otamo mine, Siikainen, donated by P. Paananen, series of specimen from Vitaniemi ore-field (vayrynenite, lithiophilite, purpurite etc.) collected by M.S. Alferova. Specimens from Parainen (Pargas) deposit, donated by N.V. Chukanov, contain recently discovered fluorphlogopite and fluoro-edenite.

Specimens of realgar, gypsum and kyanite from **Macedonia** (25) were already mentioned in the mineral species section of this review. Half of **Italian** specimens (24) are represented by new for the Museum mineral species, including alloriite and biachellaite. A series of the high-quality specimens of zeolites, some of which are new for the Museum, from Isle of Sky and mullite from type-locality on Isle of Mull, both — Scotland, **UK** were collected and donated by M.S. Alferova. The majority of acquisitions from **Republic of South Africa** are gold-bearing conglomerates from West Drifontein Gold Mine, Witwatersrand, donated by M.I. Novgorodova. Amongst mineral specimens from **Bulgaria** (20) it is worth to mention new mineral species of manganilvaite (type specimen) donated by the

author — Iv. Bonev, neotocite and rhodochrosite from Obrochische region, and galena hopper crystal intergrowth from Krushev Dol, Madan, Rhodopes donated by National Museum "Earth and Men" in Sofia. Specimens from **Mexico** (20) besides the above mentioned moganite specimens are represented by pinkish danburite crystals and druse from Charcas mine, San Luis Potosi, big (11 cm across) rhombododecahedron of grossular from Sierra de Las Cruces. The most exciting acquisitions from **Vietnam** (17) — are elbaite, aquamarine, 'gem-quality' amazonite, spinel — all were described above.

Among specimens from **India** (15) there are several large spectacular pieces of apophyllite, stilbite and scolecite. **Canada** (15) is represented with specimens of meyonite from Greenville, Quebec, showing bright fluorescence and number of rare minerals including two type specimens of gjerdingenite-Na and niveolanite discovered by I.V. Pekov. **Norway** and **Czech Republic** supplied 13 specimens each. These are mostly new mineral species for the Museum. The finest acquisitions from **Pakistan** (11) include orange-brown translucent columnar bastnäsite-(Ce) crystal approximately 3.5 cm long from Warsak (Wanna); tabular brookite crystals from Kharan, Balochistan; forsterite crystal intergrowths from Suppat area, Manshera; group of transparent pale-brown topaz crystals on albite (clevelandite) from Shigar Valley (donated by A. Ivonin) and schörl crystals overgrown by clevelandite, from the same locality (donated by F. Wafi). The most interesting specimen from **China** (12) is high quality specimen of a recently discovered ottensite, Qinglong, Guizhou Province. Fluorite druses, amethyst geode and agate from Brazil (11) were mentioned above; also the following **Brazilian** specimens were donated or exchanged: uvite crystal on quartz from Brumado (A. Ivonin), massive coarse-grained rhodonite from Conselheiro Lafaiete, Minas Gerais (D.I. Belakovskiy) and recently discovered menezesite.

From other countries first of all should be mentioned tetragontrioctahedral spessartine crystals from Engusero Sambu mine close to Loliondo town, **Tanzania** (photo 15). One of the spessartine crystals was donated by L.V. Olysyh. This is new material start coming to the market in the late 2007. The opal pseudomorph after belemnite from Cober Pedy, **Australia**

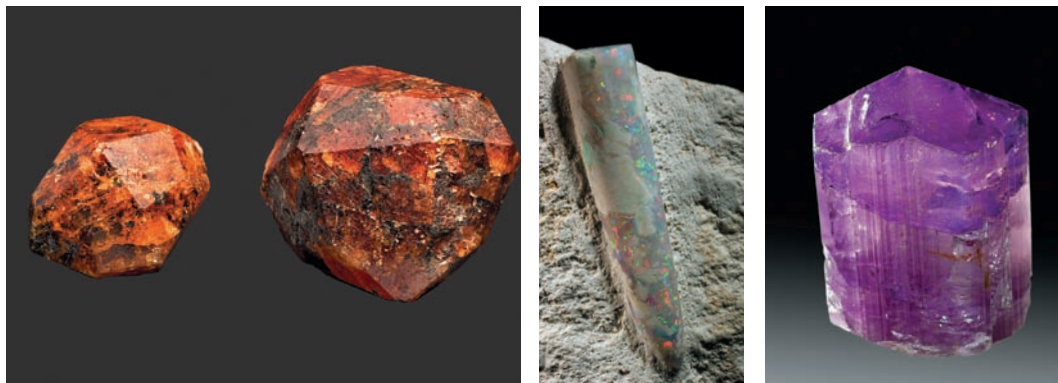


Photo 15. Spessartite. Tetragon-threeoctahedral crystals with black inclusions of manganese oxides and with mica inclusions. Engusero Sambu village, 35 km north-east of town Loliondo, Tanzania. On the left – size 4 cm. Cat. No 92529, Donated by L.V. Olysykh. On the right – size 6 cm. Cat. No 92573. Purchase.

Photo 16. Noble opal. Pseudomorph after belemnite. Size 4 cm, Cober Pedy, Australia. Cat. No OP 2451. Exchange.

Photo 17. Marialite. Prismatic crystal 3.5 cm in size. Badakhshan, Afganistan. Donated by D.I. Belakovskiy. Cat. No 92395.

Photo N.A. Pekova

Photo 18. Synthetic quartz. Broken natural quartz druze regenerated with synthetic quartz in an autoclave. Crystal termination colored blue by cobalt. Size 19 cm. Grown in Alexandrov city (VNIISIMS), Purchase. Cat. No K4973.



(photo 16) catalogued into pseudomorph collection. Relatively small but intensively coloured marialite crystal from **Afghanistan** (photo 17) is very similar to those from Kukurt river valley, Eastern Pamir, Tajikistan. Andradite crystals intergrowth, vesuvianite crystal along with the new specimens of prehnite and epidote have been arrived from Kayes region, Mali.

The most geographically exotic acquisition was donated by A.A. Laiba. It is seabed ground collected in Arctic Ocean, near the Northern Pole on the 1st of August 2007 by scientific expedition "Academician Fedorov" survey vessel. According to the X-ray data it consists of chlorite-quartz-mica aggregate.

Synthetic blue quartz druse coloured by cobalt compounds, from Alexandrov synthetic materials plant (VNIISIMS) is the most interesting among all the artificial materials obtained (photo 18).

New acquisitions by it's type and source

The bigger part of new acquisitions – 60 % donated to Museum by 150 persons and 6 organizations. Among contributors – 132 are Russian citizens and 18 are citizens of nine other countries. Fersman Mineralogical Museum RAS very gratefull to all contributors.

The most active donator for indicated period was again I.V. Pekov who contributed 109 specimens mainly from Khibiny and Lovozero massifs, Kola, Russia and from some foreign deposits. Among donated items — 12 type specimens of new mineral species. A big collection (82 specimens), mostly from Bou Azzer, Morocco gifted by R.A. Vinogradova. D.I. Belakovskiy donated 62 specimens. 35 items contributed by T.N. Shuriga. Valuable specimens donated by N.V. Chukanov (24), S.N. Britvin (23), A.I. Ponomarenko (22), J.E. Patterson (22), V.V. Levitsky (20), M.I. Novgorodova (17), A.L. Kidwell (17), P.F. Andrushchenko (16), A.V. Kasatkin (16), A.O. Agafonov (15), E.M. Spiridonov (15), A.P. Khomyakov, N.P. Suslov (12), D.A. Romanov (11), I.V. Banhchikova (10), G.A. Pelymsky (10).

Five or more specimens donated by A.A. Agakhanov, M.S. Alferova, B.A. Bogatyrev, I.V. Chaplygin, K. Erler, V.G. Grishin, E.P. Gurov, V.Yu. Karpenko, M.M. Moiseev, L.A. Pautov, N.N. Pertsev, V.V. Ponomarenko, G.P. Ponomarev, L.S. Skobel, A.D. Slukin, L.P. Vergasova, E.M. Verichev, A.V. Voloshin, A.E. Zadov.

Up to 5 specimens donated by A.M. Abdrakhimov, D.V. Abramov, S.V. Afanasiev, G.V. Agapova, P.V. Bantsekov, V.L. Barsukov, N.B. Belenkov, V.E. Beltenev, S.I. Belykh, N. Bondarenko, Iv. Bonev, E.A. Borisova, L.V. Borisova, V. Brekler, V.G. Bubennikov, G.I. Bubennikova, F. Chalidze, A.A. Chernikov, B.V. Chesnokov, D.V. Davydov, W. De Lorrain, L.V. Dmitriev, Zh.V. Dombrovskaya, M.D. Dorfman, Yu.M. Dymkov, R.D. Dzhenchuraeva, A. Firer, G.N. Gamyranin, V.M. Gazeev, A.A. Godovikov, E.V. Golubovskaya, S.S. Gorokhov, A.S. Gorshkov, N. Gospodinov, Yu.D. Gritsenko, S.V. Gritsuk, W. Heller, A. Ivanov, O.K. Ivanov, V.G. Ivanov, A. Ivonin, V.N. Kalachev, B.Z. Kantor, P.M. Kartashev, V.I. Kazansky, A. Klevtsov, K.K. Klopotov, A. Klyuchkin, Yu.S. Kobayashov, S.V. Kolisnichenko, A.E. Kolomentsev, A.A. Konev, V.G. Korinevsky, A.N. Korobkov, T. Korson, O.I. Kotlyar, Yu. Kovach, I. Kovalenko, I.I. Kupriyanova, A.A. Laiba, S.A. Lazurenkov, A. Levin, V.N. Levin, R. Liferovich, O.A. Lopatkin, A.O. Mazarovich, I.M. Mertsalov, K. Moisyuk, M. Monzer, N.N. Mozgova, A.B. Nikiforov, L.V. Olysysh, M. Origlieri, P. Paanen, W. Paar, W. Pinch, A.S. Podlesnyi,

Yu.K. Pustov, L.Z. Reznitsky, G.V. Rile, O.M. Rosen, V.V. Rudnev, D.A. Ryabukhin, T.V. Ryleeva, N. Saakyan, R. Saakyan, D.A. Sadilenko, A.N. Sapozhnikov, E.I. Semenov, V.V. Seredin, L.I. Shabynin, V.V. Sharygin, B.B. Shkursky, E.P. Shpanov, G.A. Sidorenko, S.F. Sobolev, E.L. Sokolova, A.V. Surkov, P.P. Tarasov, I.A. Tkachenko, V.V. Tkachenko, D.E. Tonkacheev, A.G. Turchkova, N.G. Udovkina, B.I. Vaintrub, S. Vasil'ev, B.M. Vladimirov, F. Wafi, T. Weidner, M.A. Yudovskaya and G.B. Zhilinsky.

Among organizations nine specimens were contributed by Museum "Earth and Men", Sofia, Bulgaria; Museum of Irkutsk Polytechnical institute, Russia; Museum of Moscow Oblast' pedagogical university, Russia; Academy of Sciences, Sofia, Bulgaria; Polar Urals geologyprospectical expeditions and group of companies "Stone Flower".

Of 157 specimens catalogued in 2006 – 2008 which were collected by Museum staff more then one half (93) were actually collected before indicated period. It mostly related to expeditions of the end of 1980-s or even ealier. They catalogued with a delay because it took a long time to process, to prepare, to make ineditifications, labels etc. The rest (64) were collected recently mostly in collection tours which were not paid by Museum.

19 members of Museum's staff took part in collecting mineral specimens which were catalogued at indicated period. The most part collected with participation of D.V. Abramov (70), A.B. Nikiforov (69), D.A. Romanov (54), D.I. Belakovskiy (36), M.S. Alferova (27), T.M. Pavlova (15), B.B. Shkursky (14), S.N. Nenasheva (10), N.A. Mokhova (8), M.M. Moiseev (6), and also M.D. Dorfman, A.I. Ponomarenko, E.L. Sokolova, V.I. Stepanov, L.A. Pautov, A.A. Agakhanov, V.Yu. Karpenko, A.V. Kovalev, N.S. Nikulshin.

Finishing that review we want to thank again on behalf of Fersman Mineralogical Museum RAS all those who made their contributions of any kind for Museum and make possible that review to appear.

The authors also thank I.V. Pekov and A.B. Nikiforov for discussions, valueable notes and help in preparation of that review.

Appendix №1. List of mineral species new for Fersman Mineralogical Museum catalogued in 2006–2008

1. Abramovite *	52. Faizievite *	103. Lourenswalsite	154. Pokrovskite
2. Adamsite-(Y)	53. Falcondoite	104. Lucasite-(Ce)	155. Polkanovite
3. Allabogdanite	54. Felbertalite	105. Magnesiohoegbomite-6N6S	
4. Allochalcocelite	55. Ferrarisite	106. Majorite	156. Potassicferri- magnesiosadanagaite
5. Allorite	56. Ferroactinolite	107. Malyshevite *	157. Potosiite
6. Aluminocerite-(Ce)	57. Ferroaluminoceladonite	108. Manganbelyankinite	158. Pseudorutile
7. Aluminomagnesiohulsite	58. Ferrohornblende	109. Manganilvaite	159. Punkaruivite
8. Ammoniojarosite	59. Ferrokentbrooksite	110. Manganocummingtonite	160. Richelsdorfite
9. Andrianovite	60. Ferromerrillite	111. Manganogrunerite	161. Ringwoodite
10. Aqualite	61. Ferroskutterudite *	112. Mangazeite	162. Roedderite
11. Argentojarosite	62. Ferrostrunzite	113. Marinellite	163. Roesslerite
12. Armbrusterite	63. Fizelyite	114. Menezesite	164. Rouaite
13. Artroeite	64. Fluorcalciobriitholite	115. Merrillite	165. Rudashevskite
14. Attikaite	65. Fluorophlogopite	116. Metavariscite	166. Sahamalite-(Ce)
15. Barahonaite-(Fe)	66. Footemineite	117. Metavauxite	167. Samarskite-(Yb)
16. Bararite	67. Francoisite-(Nd)	118. Miassite	168. Schafarzskite
17. Barringerite	68. Francoisite-(Ce)	119. Middendorfit	169. Scheuchzerite
18. Batisvite	69. Georgbarsanovite *	120. Morimotoite	170. Schoellhornite
19. Belendorfite	70. Georgbokiite	121. Mozartite	171. Schulenbergite
20. Bendadaite	71. Gillardite	122. Mrazekite	172. Seamanite
21. Biachellaite	72. Gjerdingerite-Na	123. Nalivkinite *	173. Senkevichite *
22. Bobjonesite	73. Gjerdingerite-Ca	124. Nanpingite	174. Sewardite
23. Bonaccordite	74. Glaucozerinite	125. Nealite	175. Sidwillite
24. Brassite	75. Haapalaite	126. Nechelyustovite	176. Simonkolleite
25. Britvinite *	76. Hafnon	127. Nichromite	177. Skorpionite
26. Brownmillerite	77. Hagendorfite	128. Nickelphosphide	178. Slawsonite
27. Burkeite	78. Hallimondite	129. Niningerite	179. Sokolovaite *
28. Bykovaite	79. Haxonite	130. Niveolanite *	180. Stanfieldite
29. Cadmoindite	80. Heideite	131. Olmiite	181. Stishovite
30. Calcio-olivine	81. Heulandite-Ba	132. Orickite	182. Straczekite
31. Calderite	82. Hundholmenite-(Y)	133. Orthocrysotile	183. Stratlingite
32. Carbokentbrooksite	83. Hydroxylbastnaesite-(Ce)	134. Ottensite	184. Stronalsite
33. Carlosturanite	84. Hydroxylborite	135. Paarite	185. Suessite
34. Carlsbergite	85. Ivanyukite-K	136. Painite	186. Suolunite
35. Caryochroite	86. Ivanyukite-Na	137. Palladodymite	187. Takedaite
36. Caryopileite	87. Janhaugite	138. Paradamite	188. Tamaite
37. Cascandite	88. Jasmundite	139. Parafransoletite	189. Taseqite
38. Challacolloite	89. Johachidolite	140. Paramelaconite	190. Tazieffite
39. Chesnokovite	90. Kamarizait *	141. Parasymphesite	191. Touunkite
40. Chistyakovaite	91. Karasugite	142. Paratooite-(La)	192. Tsepinite-Na
41. Chlorbartonite	92. Karchevskiyite	143. Pautovite *	193. Uramarsite
42. Chukanovite	93. Katoite	144. Pekovite *	194. Vikingite
43. Cochromite	94. Keilite	145. Pellouxite	195. Wilhelmramsayite
44. Coirait	95. Kozoite-(La)	146. Perryite	196. Wittite
45. Dovyrenite	96. Krieselite	147. Pertsevite	197. Xocolatlite
46. Droninoite	97. Labyrinthis	148. Phosphohedyphane	198. Yvonite
47. Dualite	98. Lakargiite	149. Phosphoinnellite *	199. Zeravshanite *
48. Earlschannonite	99. Lantanite-(Nd)	150. Piergorite-(Ce)	200. Zirsilite-(Ce)
49. Eirikite	100. Levyne-Ca	151. Pinchite	
50. Eskimoite	101. Liebenbergite	152. Platynite	
51. Esseneite	102. Lingunite	153. Podlesnoite	

Mineral species given in bold represented by type specimens or cotypes or their fragments.

* – mineral species discovered by Museum staff or in collaboration with Museum staff.