

MINERALS OF HUNGARY, STATE OF THE ART IN 1996

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ABSTRACT

After a historical introduction, and a discussion on the reliability of data and the documentation of samples a tabulated list of the mineral species described from Hungary is given. Species names are arranged alphabetically by classes (except for silicates, which are subdivided to subclasses). The species that were included in the second (1985) edition of *Magyarország ásványai* (Minerals of Hungary) of Sándor Koch („KM2 species”) and the species that were not mentioned by this work („post-KM2 species”) are listed separately. Uncertain KM2 species are given as an appendix to the list of the KM2 species. Some 440 valid mineral species are known from Hungary at present. The number of the known species has nearly doubled in the last decade, the increase was especially high among the arsenates and halides.

1. HISTORICAL INTRODUCTION

The minerals of the present territory of Hungary was reviewed first by KOCH (1927) in a short paper. Later he published a monographical treatise of the minerals of Hungary. While the first edition of his monograph (KOCH, 1966) was entirely his work, the second edition (KOCH, 1985, referred here as KM2) was edited by József Mezösi.

In the 1980's two manuscript volumes of the „Mineralogical Encyclopaedia of Hungary” (PAPP & WEISZBURG, 1986; MOLNÁR & PAPP, 1990) were prepared by the staff of the Dept. of Mineralogy, Eötvös L. University (Budapest). This research brought forward a great deal of old, almost forgotten information; however, the real importance of these compilations was the critical review of the available data and the separate discussion of the uncertain descriptions. It is to be noted, that the most uncertain data were listed as well.

In the last decade the number of mineral species of Hungary considerably increased, most of the new ones („post-KM2 species”) were mentioned first by SZAKÁLL & GATTER (1993). That book and this paper attempt to keep a critical approach similar to that of the „Mineralogical Encyclopaedia of Hungary”.

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2. THE HUNGARIAN MINERAL SPECIES IN KMH2 AND TODAY

2.1. REMARKS ON THE RELIABILITY OF DATA – „CERTAIN” AND „UNCERTAIN” SPECIES

The reliability of the data on the presence of the different mineral species in Hungary is different. On one hand it depends on our knowledge on the specific mineral occurrence: the accuracy of the published descriptions, the quantity and quality of the experimental and other investigations, etc.; on the other it depends on the difficulties of the identification of the given species in general. It is impossible to establish exact and overall criteria for the reliability of the data, every judgement is unavoidably subjective. However, for every species it is necessary to draw a line somewhere to separate the certain and the uncertain (doubtful) occurrences.

In this way we classified the KMH2 species into two categories: certain and uncertain (doubtful) ones, both groups are listed separately in this paper. The same principle was applied to the post-KMH2 species, but the uncertain ones are not listed here. The importance of this critical approach is demonstrated on two examples of the general use of uncertain data.

In the 1950s lemon-yellow, pulverulent coatings were found on calcite crystals in prospecting adits near Parádsasvár (Mátra Mts.). This material was mentioned as greenockite in KMH2; however, it is not known what studies this statement is based on. It is still unclear whether the few μm -size Cd- and S-bearing aggregates in the coatings correspond to greenockite or hawleyite (or other??). In spite of the lack of any proof the mineral is regarded as greenockite by all Hungarian scientific and popular mineralogical books (it even appeared as greenockite on a postage-stamp).

There is a similar situation with cervantite: it is mentioned in several older publications as an alteration product of stibnite from different Hungarian localities. Nevertheless, X-ray studies of such products proved the presence of other antimony oxide minerals but cervantite. This fact certainly does not exclude the existence of cervantite in Hungary; however, the earlier references has not been proven yet.

Two kinds of uncertain species are distinguished here. One question-mark (?) denotes those KMH2 species that are first qualified as uncertain in *this paper*. In *our opinion* these species were published with insufficient (or without any) data. For example in some cases the published results made only possible the classification of the material into a mineral group instead of the usage of a species name.

Two question-marks (??) denote those KMH2 species that were qualified as uncertain already in the *original paper*. These species were regarded as doubtful ones by *the authors of the original paper*. Hence, the double-queried species are more doubtful than the single-queried ones.

2.2. REMARKS ON POST-KMH2 SPECIES

Those minerals that were denoted in the KMH2 with group (or series) names (apophyllite, olivine, tourmaline, etc.) are omitted from this paper. Some of these minerals were re-examined and classified according to the existing international nomenclatural rules, and they are listed among the post-KMH2 species.

It is to be noted that some species are listed among the post-KMH2 species in spite of their publication predates 1985 (year of publication of KMH2), because they were not included in KMH2 for various reasons.

2.3. REMARKS ON THE DOCUMENTATION OF THE SAMPLES

During the compilation of the species lists we attempted the re-examination and classification of the uncertain species and those minerals that were originally described only on group level. In many cases the lack of the original (or at least equivalent) samples made this attempt impossible. Therefore it is strongly recommended that the authors should always send samples from scientifically interesting mineral species and parageneses to public collections. It is also highly desirable that all samples containing rare or previously unknown mineral species from Hungarian localities should also get into public collections. This is of essential importance in the case of unique, irreplaceable specimens.

The importance of adequate documentation and preservation of even the smallest samples from unique specimens has already been recognised on international level. In some descriptive sciences only those publications are approved, whose object (material) is adequately documented, deposited and inventoried in a public collection. The survival of the samples in the sample collection of the researchers or of the researchers' institute is usually uncertain, and even in this case the inadequate specimen labelling used by the researchers frequently makes the specimen useless.

For the demonstration of the importance of the adequate documentation and preservation of samples, the name of those Hungarian mineral species that are missing from the Hungarian public collections are printed in italics in our species list. Out of about 440 Hungarian mineral species there is no sample of some 50 species in the Hungarian public mineral collections (according to their inventories). It is practically impossible to perform further studies on these species for lack of samples. (It is to be noted that the identification of the unpublished species listed in this paper is based on detailed studies on documented and inventoried samples, which are available for further research.)

3. INTRODUCTION TO THE TABLES

Species names are arranged alphabetically by classes (except for silicates, which are subdivided to subclasses). Only those species are included that are considered as valid species by relevant mineralogical handbooks (e.g. Fleischer & Mandarino, 1995; Nickel & Nichols, 1991) and the IMA CNMMN resolutions. In each class the species that were included in the second (1985) edition of *Magyarország ásványai* (Minerals of Hungary) of Sándor Koch are tabulated first („KMH2 species”). Uncertain KMH2 species are given as an appendix to this list.

In each class a second list comprises the species that were not mentioned by Koch (1985), („post-KMH2 species”). Reference is always given to the first paper containing satisfactory data on the existence of the given species. In the case of unpublished species the author of the first unpublished study with reliable data and adequate sample documentation is quoted.

According to these lists some 440 mineral species are known from Hungary at present. It can be stated that the number of the Hungarian species has considerably increased since

the publication of KMH2. The number of the species has nearly doubled, the increase was especially high among the arsenates and halides.

NATIVE ELEMENTS

KMH2 Native Elements

arsenic	gold	<i>tellurium</i>
bismuth	mercury	
copper	sulphur	

Uncertain species: ??platinum

Post-KMH2 Native Elements

<i>antimony</i> (Nagy, 1986)	kamacite (Mauritz, Hegedűs & Szelényi, 1953)
cohenite (Buchwald, 1975)	moschellandsbergite (Szakáll & Kovács, 1995)
graphite (Árkai, Horváth & Tóth, 1981)	schreibersite (Buchwald, 1975)
haxonite (Buchwald, 1975)	silver (Szakáll & Kovács, 1995)
iron (Sztrókay, Tolnay & Földvári-Vogl, 1961)	taenite (Mauritz, Hegedűs & Szelényi, 1953)

SULPHIDES

KMH2 Sulphides

acanthite	galena	pyrite
arsenopyrite	hessite	pyrrhotine
bismuthinite	<i>idaite</i>	realgar
bornite	joséite-A	<i>seligmannite</i>
<i>boulangerite</i>	<i>löllingite</i>	semseyite
bournonite	luzonite	sphalerite
chalcocite	marcasite	<i>stannite</i>
chalcopyrite	mátraite	stephanite
chalcostibite	metacinnabar	stibnite
cinnabar	molybdenite	<i>tellurobismuthite</i>
<i>cobaltite</i>	<i>nickeline</i>	tennantite
cosalite	orpiment	tetradymite
covellite	pentlandite	tetrahedrite
<i>emplectite</i>	pilsenite	wittichenite
enargite	proustite	wurtzite
freibergite	pyrargyrite	

Uncertain species: ?berthierite, ?clausthalite, ??cubanite, ?famatinite, ??ferroselite, ?galenobismutite, ??gersdorffite, ?greenockite, ??guanajuatite, ?hauchecornite, ?jamesonite, ?lautite, ??meneghinite, ??miargyrite, ??millerite, ?montbrayite, ?nagyágite, ?petzite, ??sartorite, ?schapbachite, ??sternbergite, ?sylvanite, ?vaesite, ?valleriite

Post-KMH2 Sulphides

altaite (First, unpublished)	<i>glaucodot</i> (Nagy, 1990)
arsenosulvanite (Dobosi, 1984)	goldfieldite (Dobosi & Nagy, 1993)
<i>calaverite</i> (Nagy, 1985)	greenockite (Dódony & Szakáll, unpublished)
capgaronnite (Sarp & Szakáll, unpublished)	<i>heazlewoodite</i> (Ghoneim & Szederkényi, 1979)
coloradoite (First, unpublished)	heteromorphite (Nagy, 1986)
colusite (First, unpublished)	joséite-B (Weiszburg, unpublished)
cubanite (Dódony, 1986)	<i>késterite</i> (Dobosi, 1984)
digenite (Pósfai, 1990)	<i>krennerite</i> (Nagy, 1985)
djurleite (Pósfai, 1990)	kuramite (First, unpublished)
domeykite (Szakáll, 1992a)	lillianite (Dobosi & Nagy, 1984)
famatinite (Dobosi & Nagy, 1993)	mawsonite (First, unpublished)
<i>fizélyite</i> (Dobosi & Nagy, 1984)	melonite (Weiszburg et al., unpublished)
<i>galenobismutite</i> (Nagy & Dobosi, in press)	miargyrite (Horváth, 1987)
gersdorffite (Szakáll et al., unpublished)	millerite (Nemecz, 1956)

petzite (First, unpublished)
 polybasite (Szakáll et al., 1994e)
 skinnerite (Szakáll et al., unpublished)
 stannoidite (First, unpublished)

sylvanite (First, unpublished)
 troilite (Dódony, 1986)
 xanthoconite (Szakáll et al., 1994e)

HALOIDS

KMH2 Haloids

fluorite halite

Post-KMH2 Haloids

bischofite (Szakáll et al., unpublished)
 bromargyrite (Szakáll & Kovács, 1995)
 chlorargyrite (Szakáll et al., 1994c)
 eriochalcite (Szakáll et al., unpublished)
 iodargyrite (Szakáll & Kovács, 1995)

paratacamite (Szakáll, 1992a)
 perrouditite (Sarp & Szakáll, unpublished)
 sal ammoniac (Szakáll, 1989)
 sylvite (Molnár & Takács, 1993)

OXIDES

KMH2 Oxides

anatase	diaspore	quartz
arsenolite	gibbsite	<i>ramsdellite</i>
<i>baddeleyite</i>	goethite	romanëchite
bindheimite	<i>grouitite</i>	rutile
böhmite	hematite	schoepite
brannerite	ilmenite	senarmontite
brucite	lepidocrocite	spinel
chromite	lithiophorite	tenorite
clarkeite	magnetite	todorokite
corundum	manganite	tridymite
crystalobalite	<i>nsutite</i>	uraninite
cryptomelane	opal	valentinite
cuprite	pyrolusite	

Uncertain species: ??baurnoite, ?becquerelite, ?brookite, ?cervantite, ?curite, ??fourmarierite, ?ianthinite, ?maghemite, ?metacalcioiranoite, ?montroseite, ?nordstrandite, ?russellite, ?tellurite, ?thorianite, ??zirkelite

Post-KMH2 Oxides

<i>bayerite</i> (Náray-Szabó & Péter, 1967)	magnesiochromite (Embey-Isztin et al., 1989)
cassiterite (Szakáll & Kovács, 1993)	nordstrandite (Náray-Szabó & Péter, 1967)
<i>cerianite</i> (Pantó, 1975)	<i>perovskite</i> (Pantó, 1975)
<i>claudeite</i> (Koch, 1966)	portlandite (Szakáll & Kovács, 1992)
délafofossite (Szakáll & Jánosi, unpublished)	pseudobrookite (Szakáll, 1992b)
ferberite (Szakáll et al., 1995)	ranciëite (Szakáll, 1992a)
hercynite (Török, 1993)	stibiconite (Jánosi & Papp, 1985)
hübnerite (Szakáll et al., 1995)	<i>thorianite</i> (Pantó, 1975)
ice	tripuhyite (Sajó, unpublished)
maghemite (Mindszenty et al., unpublished)	ulvöspinel (Harangi & Árva-Sós, 1993)

CARBONATES

KMH2 Carbonates

andersonite	dawsonite	rhodochrosite
ankerite	dolomite	scarbroite
aragonite	huntite	siderite
azurite	liebigite	smithsonite
<i>bastnäsite-(Ce)</i>	magnesite	<i>vaterite</i>
calcite	malachite	
cerussite	otavite	

Uncertain species: ?alumohydrocalcite, ?kutnohorite, ??parisite-(Ce), ??röntgenite-(Ce), ?swartzite, ??synchysite-(Ce)

Post-KMH2 Carbonates

aurichalcite (Szakáll, 1992a)
claraité (Szakáll et al., unpublished)
dypingite (Kiss & Jánosi, 1994)
hydromagnesite (Bognár, 1986)
hydrotalcite (Papp, 1988)
hydrozincite (Szakáll, 1992a)
kutnohorite (Grasselly et al., 1985)

nesquehonite (Kiss & Jánosi, 1994)
niter (Kvassay, 1876)
northupite (Kiss & Jánosi, 1994)
rosasite (Szakáll et al., unpublished)
synchysite-(Ce) (Szakáll, 1992a)
trona (Szakáll et al., unpublished)
zincrosasite (Várhegyi, unpublished)

SULPHATES

KMH2 Sulphates

aluminite
alunite
alunogen
anglesite
anhydrite
barite
basaluminite
bassanite
brochantite
celestine

chalcantite
copiapite
epsomite
glauberite
goslarite
gypsum
halotrichite
hexahydrate
jarosite
kalinite

melanterite
mendozite
parabutterite
rozenite
scheelite
szomolnokite
tschermigite
uranopilite
zippeite

Uncertain species: ??argentojarosite, ??kröhnkite

Post-KMH2 Sulphates

antlerite (Szakáll, 1992a)
blöditte (Kiss & Jánosi, 1994)
bonattite (Szakáll et al., in press)
botryogen (Szakáll et al., in press)
coquimbite (Szakáll et al., in press)
devilline (Szakáll et al., in press)
fibroferrite (Szakáll et al., in press)
formacite (Szakáll et al., in press)
hydronium jarosite (Papp, 1990)
kokaite (Szakáll et al., in press)
letovicite (Szakáll, 1992a)
linarite (Szakáll et al., in press)
magnesiocopiapite (Szakáll et al., in press)
mascagnite (Szakáll, 1992a)
millosevichite (Szakáll et al., in press)

mirabilite (Szatmári, 1966)
natrojarosite (Papp, 1990)
pickeringite (Szakáll et al., in press)
plumbojarosite (Szakáll et al., 1994b)
posnjakite (Szakáll, 1992a)
rhomboclase (Viczián et al., 1986)
römerite (Szakáll et al., in press)
sideronatrite (Szakáll et al., in press)
siderotil (Szakáll et al., in press)
slavikite (Szakáll et al., in press)
starkeyite (Szakáll et al., in press)
strontianite (Miklós, 1987)
tamarugite (Szakáll, 1992a)
thénardite (Kiss & Jánosi, 1994)
voltaite (Szakáll et al., in press)

PHOSPHATES AND ARSENATES

KMH2 Phosphates and arsenates

autunite
beraunite
brushite
cacoxenite
carbonate-hydroxylapatite
cheralite
crandallite

fermorite
florencite-(Ce)
fluorapatite
kingite
koninckite
lazulite
meta-autunite

monazite-(Ce)
pyromorphite
vashegyite
vivianite
wavellite
xenotime-(Y)

Uncertain species: ??carnotite, ?delvauxite, ?saléeite, ?tyuyamunite

Post-KMH2 Phosphates and arsenates

annabergite (Szederkényi, 1962)
arseniosiderite (Szakáll et al., 1994a)
bayldonite (Szakáll et al., unpublished)
beudantite (Szakáll et al., 1994a)
conichalcite (Szakáll et al., 1994a)

diadochite (Földvári & Nagy, 1985)
gorceixite (Szentpétery et al., 1989)
kaňkite (Szakáll et al., unpublished)
mimetite (Szakáll & Kovács, 1994)
monetite (Sztórkay, 1959)

olivenite (Szakáll et al., 1994a)
 pharmacosiderite (Szakáll et al., 1994a)
 micropharmacolite (Szakáll et al., 1994a)
 rhabdophane-(Ce) (Nagy G., unpublished)
 saléeite (Kiss, 1961)
 scorodite (Szakáll et al., 1994a)

segnitite (Szakáll et al., 1994a)
 talmessite (Szakáll et al., 1994a)
 taranakite (Szakáll & Jánosi, 1993)
 tyrolite (Szakáll et al., 1994a)
 variscite (Szakáll et al., 1994d)

NESOSILICATES

KMH2 Nesosilicates

almandine	kasolite	<i>thorite</i>
andalusite	kyanite	titanite
andradite	soddyite	topaz
coffinite	staurolite	uranophane
forsterite	thaumasite	zircon

Uncertain species: ?pyrope, ?spessartine.

Post-KMH2 Nesosilicates

chloritoid (Noske-Fazekas, 1973)	<i>pyrope</i> (Török, 1995)
datolite (Szakáll et al., unpublished)	<i>schorlomite</i> (Horváth & Ódor, 1984)
fayalite (Buda, 1993)	sillimanite (Mauritz, 1909)
grossular (Soós et al., 1991)	spessartine (Török, unpublished)
mullite (Sztrókay, 1986)	

SOROSILICATES

KMH2 Sorosilicates

allanite-(Ce)	hemimorphite	zunyite
<i>bertrandite</i>	vesuvianite	
epidote	zoisite	

Uncertain species: ?clinozoisite

Post-KMH2 Sorosilicates

clinozoisite (Török, unpublished)	gehlenite (Dódonny & Jánosi, unpublished)
ferro-axinite (Szakáll, 1993)	pumpellyite (Árkai, 1973)

CYCLOSILICATES

KMH2 Cyclosilicates

<i>beryl</i>	cordierite	schorl
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Uncertain species: ?elbaite, ?osumilite

Post-KMH2 Cyclosilicates

dravite (Demény, 1987)	roedderite (Török & Szakáll, unpublished)
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INOSILICATES

KMH2 Inosilicates

actinolite	enstatite	prehnite
augite	inesite	tremolite
diopside	kaersutite	wollastonite

Post-KMH2 Inosilicates

aegirine (Mauritz, 1913)	magnesiohornblende (Harangi, unpublished)
crossite (Kubovics, 1983)	nekoite (Sajó, unpublished)
edenite (Harangi, unpublished)	okenite (Sajó, unpublished)
glaucophane (Lelkes-Felvári, 1982)	pectolite (Szakáll et al., unpublished)
grunerite (Buda, 1993)	pigeonite (Soós & Dódonny, 1989)
<i>hedenbergite</i> (Dódonny & Gatter, 1988)	tobermorite (Papp, 1988)
magnesiohastingsite (Harangi, unpublished)	tschermakite (Harangi, unpublished)

PHYLLOSILICATES

KMH2 Phyllosilicates

antigorite	glauconite	orthochrysotile
biotite	halloysite	palygorskite
celadonite	illite	pyrophyllite
chamosite	kaolinite	saponite
clinochlore	lizardite	<i>sudoite</i>
clinochrysotile	montmorillonite	talc
cronstedtite	muscovite	
dickite	nontronite	

Uncertain species: ?amesite, ?brammallite, ?chrysocolla, ?donbassite, ?hydrobiotite, ?metahalloysite, ??nacrite, ?phlogopite, ?sepiolite, ?stilpnomelane

Post-KMH2 Phyllosilicates

annite (Török, 1996)	hisingerite (Szakáll et al., unpublished)
<i>beidellite</i> (Varga-Máthé, 1966)	paragonite (Felvári & Viczián, 1972)
caryopilite (Dódoný & Gatter, 1986)	phlogopite (Szabó, 1985)
chrysocolla (Szakáll & Földvári, 1996)	<i>rectorite</i> (Nemecz et al., 1963)
clintonite (Fehér, unpublished)	sepiolite (Nemecz, unpublished)
<i>corrensitite</i> (Viczián, 1993)	stilpnomelane (Árkai et al., 1981)
fluorapophyllite (Szakáll et al., unpublished)	vermiculite (Raincsák-Kosáry, 1978)

TECTOSILICATES

KMH2 Tectosilicates

albite	gonnardite	orthoclase
analcime	heulandite	phillipsite
chabazite	laumontite	sanidine
clinoptilolite	leucite	<i>scolecite</i>
epistilbite	levyne	stilbite
<i>garronite</i>	mesolite	tetranatrolite
gismondine	mordenite	thomsonite
gmelinite	natrolite	

Post-KMH2 Tectosilicates

anorthite (Pantó, 1974)	microcline (Buda, 1969)
anorthoclase (Vincze-Szeberényi, 1982)	nepheline (Mauritz, 1913)
dachiardite (Szakáll, 1992c)	offretite (Szakáll & Jánosi, unpublished)
ferrierite (Szakáll, 1992c)	sodalite (Mauritz, 1913)
harmotome (Szakáll, 1992b)	stellerite (Jánossy et al., 1987)
<i>meionite</i> (Török, 1994)	yugawaralite (Rappensberger, 1991)

ORGANIC MINERALS

KMH2 Organic minerals

mellite
whewellite

Post-KMH2 Organic minerals

humboldtine (Weiszbürg et al., unpublished)

REQUEST TO THE READER

The author is grateful for any information that may complete this compilation (interesting samples, forgotten or unpublished results, papers that escaped our attention, etc.).

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