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Nomenclature of the micas

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ABSTRACT

End-members and species defined with permissible ranges of composition are presented for the true micas, the brittle micas, and the interlayer-deficient micas. The determination of the crystallochemical formula for different available chemical data is outlined, and a system of modifiers and suffixes is given to allow the expression of unusual chemical substitutions or polytypic stacking arrangements. Tables of mica synonyms, varieties, ill-defined materials, and a list of names formerly or erroneously used for micas are presented. The Mica Subcommittee was appointed by the Commission on New Minerals and Mineral Names of the International Mineralogical Association. The definitions and recommendations presented were approved by the Commission.

KEYWORDS: : mica, nomenclature.

Definition

MICAS are phyllosilicates in which the unit structure consists of one *octahedral sheet* (Os) between two opposing *tetrahedral sheets* (Ts). These sheets form a *layer* that is separated from adjacent layers by planes of non-hydrated *interlayer cations* (I). The sequence is ... I Ts Os Ts I Ts Os Ts ... The tetrahedral sheets have a composition T_2O_5, and tetrahedra are linked by sharing each of three corners (= basal atoms of oxygen) to a neighbouring tetrahedron; the fourth corner (= apical atom of oxygen) points in one direction for a given tetrahedral sheet. The coordinating anions around octahedral cations (M) consist of apical atoms of oxygen of adjacent tetrahedral sheets and anions A. The coordination of interlayer cations is nominally twelve-fold, and their charge should not be less than 0.6 per formula. The simplified formula can be written as:

$$I\ M_{2-3}\square_{1-0}T_4O_{10}A_2,$$

where

I is commonly Cs, **K**, **Na**, NH_4, Rb, Ba, **Ca**
M is commonly **Li**, **Fe** (di- or trivalent), **Mg**, Mn (di- or trivalent), Zn, **Al**, Cr, V, **Ti**
$\square$ is vacancy
T is commonly Be, **Al**, B, **Fe** (trivalent), **Si**
A is commonly Cl, **F**, **OH**, O (oxy-micas), S

(most frequently encountered elements are set in bold face; note that other substitutions are possible). The number of formula units, *Z*, may vary depending on the structure, but is equal to 2 in a 1*M* structure.

Subdivisions

Depending on the interlayer cation, the micas are subdivided into *true micas* (if ⩾50% I cations present are univalent) or brittle micas (if >50% I cations present are divalent); if the formula exhibits <0.85 and ⩾0.6 positive interlayer charges, it represents an interlayer-cation-deficient mica or, in an abbreviated form, an *interlayer-deficient mica*. In special cases (e.g. wonesite), the interlayer charge may be lower than 0.6 provided the material does not have swelling or expanding capabilities. The 0.85 charge divide holds for dioctahedral micas. To date, there are insufficient data to define an analogous limit in trioctahedral micas.

Regardless of the mica subgroup, it is *dioctahedral* if it contains < 2.5 octahedral cations (M) per formula unit; micas with ⩾2.5 octahedral cations are *trioctahedral*. Micas with intermediate octahedral occupancies occur frequently, but no provision is made for any other divisions or terms (e.g. '2½ octahedral'); the use of such terms is discouraged. Also discouraged is the division of micas into 'disilicic', 'trisilicic', and 'tetrasilicic' according to the number of silicon atoms per formula.

Octahedrally coordinated M cations may be distributed over three crystallographic positions (octahedral ordering) or two positions in structures with the *C2/m* space group. Because of this ordering, some end-member formulas do not conform to the 'chemical' 50% rule of Nickel (1992). To a lesser extent, the same applies to tetrahedrally coordinated T cations.

Principles of classification

The present classification is based on the chemical composition of micas and embodies generalizations derived from crystal-structure determinations. The inclusion of physical determinative properties as classification criteria was avoided because these properties cannot unambiguously differentiate members of the micas. Moreover, the approach adopted here reflects the belief that mica classification should be based on easily accessible chemical data and a minimum of physical measurements.

The crystallochemical formula should be based on chemical analysis, density, and cell data. If chemical data only are available, the recommended procedure to calculate a formula is as follows: (1) if there is a reliable determination of H_2O, the formula should be based on twelve O + F atoms; (2) if there is no determination of H_2O, as in microprobe analyses, an idealized anion group must be assumed, and the formula should be based on 22 positive charges; (3) if there is no determination of H_2O and there are grounds to suspect that a *later* oxidation of iron in the mica caused deprotonation of the anion group, the formula should be based on 22 + z positive charges, where z is the quantity of trivalent iron (Stevens, 1946; Foster, 1960; Rimsaite, 1970). It should be noted that lithium, concentrations of which cannot be determined with current electron microprobe techniques, is commonly overlooked in wet-chemical analyses because of its low molecular weight. Also, failure to establish the concentration of lithium has caused a number of erroneous identifications.

End-members

End-member names given below are associated with formulae containing the most frequently encountered A anion only. End members in which other A anions dominate should be designated with prefixes 'fluoro' (e.g. in muscovite), 'hydroxy' (e.g. in polylithionite), or 'oxy' (e.g. in annite). When such phases are found in nature, their proposed new mineral status and name should nonetheless be submitted for approval to the Commission on New Minerals and Mineral Names, I.M.A.

This report contains end-member formulae that are stoichiometric on the scale of the asymmetric part of the unit cell. Those mica species that do not meet this requirement (such as those in which the main end-members are not yet clear) appear as 'species that are not end-members'. To express chemical variation in compositional plots, hypothetical end members may be employed. However, because these end members have not been documented as mineral species, they may not receive mineral-like names, and only formulae or formula-like expressions should be used in such plots. Experimental determinations of miscibility limits in natural mica series will help in establishing species and in positioning boundaries between them.

Lists of valid names for true, brittle, and interlayer-deficient micas appear in Tables 1, 2, and 3, respectively. Compositional space for some dioctahedral interlayer-deficient and true micas is shown in Fig. 1.

Modifiers and suffixes

Chemical deviations from end-member compositions may be expressed by adjectival modifiers. These must be based on actual determinations to support the claim. The usage of adjectival modifiers is not mandatory. Modifiers like 'rubidian' should be used only if the element in question exceeds 10%, but not 50%, of the real occupancy of the respective position in the end-member formulae involved. Thus, a rubidian muscovite may contain between 0.1 and 0.5 Rb atoms per formula unit. If an element can enter more than one coordination, a further differentiation is possible, such as 'tetra-ferrian' or 'octa-ferrian'. If the concentration of an element is less than that necessary for the assignment of a modifier and the author wishes to acknowledge its presence, it may be done by using a modifier such as 'rubidium-containing'. The latter type of modifier should be used also if the analysis is incomplete, thus preventing the calculation of a complete crystallochemical formula.

For cases where a polytype determination has been made, the name may be suffixed with an appropriate polytype symbol (Nickel, 1993), e.g. muscovite-3*T*. There are two universal systems of polytype symbolism, both based on the modified Gard notation: one presented jointly by IMA and IUCr (Bailey *et al.*, 1977) and another, more generalized, by IUCr (Guinier *et al.*, 1984). Because of international acceptance and common usage, the Ramsdell symbolism is preferred for the micas unless exact stacking sequences or other special information need clarification; for the latter cases see Ross *et al.* (1966), Takeda and Sadanaga (1969), Zvyagin (1964), Zvyagin *et al.* (1979), or Dornberger-Schiff and Ďurovič (Ďurovič, 1981). When using the other systems or when using symbolism that is not commonly known, the author must reference its source or, preferably, specify the stacking

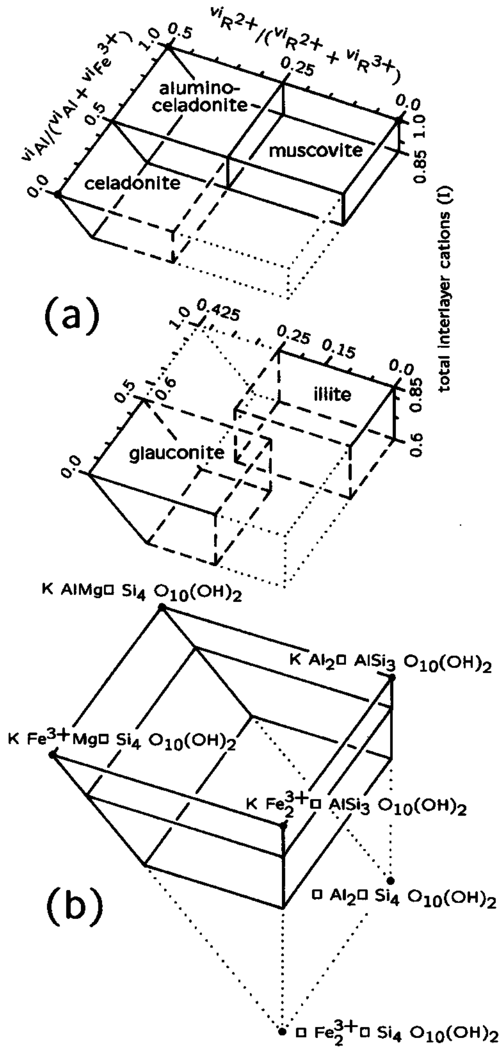

FIG. 1. A three-dimensional plot illustrating the relation of some true dioctahedral micas to interlayer-deficient dioctahedral micas. (*a*) represents two slabs cut from the chemographic volume, (*b*) shown in terms of formulae (small solid circles). Dashed lines indicate approximate borders, dotted lines complete the solid. The ratio $^{vi}R^{2+}/(^{vi}R^{2+} + {}^{vi}R^{3+})$ is equal to $x/2$ (Table 3) for micas with 2.0 octahedral cations. End-member formulae in drawing (*a*) are shown by solid circles. Glauconite with Na > K should be referred to as 'natro-glauconite'.

sequence represented by the symbols used. A review of polytypes in micas found to date can be found in Baronnet (1980), Bailey (1984) or Takeda and Ross (1995).

Series names and lists of invalid names

This report also includes series names intended to designate incompletely investigated micas that are to be used by field geologists or petrographers (Table 4). Such names (e.g. 'biotite') are defined only in some series, thus in fact sanctioning a practice that is common already. Assigning a name to an incompletely investigated layer silicate may be risky, and it should be preceded by at least optical examination. Once such material has been studied in detail, end-member names should be preferred, with or without modifiers and suffixes. Series names are not to be associated with varietal modifiers.

Names whose usage is discouraged were divided into synonyms and varieties (Table 5), ill-defined materials and mixtures (Table 6), and names formerly or erroneously used for micas (Table 7).

Justification

This paragraph summarizes grounds for some of the Mica Subcommittee's decisions.

Aluminoceladonite

The alternative term for this mica, *leucophyllite*, was considered unjustified because it invites confusion with an identical rock-name and because the type-locality leucophyllite (Starkl, 1883) is too low in alkalis to represent a mica.

Aspidolite

The Subcommittee voted to resurrect the name *aspidolite* (von Kobell, 1869), which represented an old description of what was in more recent years referred to as *sodium phlogopite* (Schreyer *et al.*, 1980). It must be pointed out that no one ever applied formally for the mineral name *sodium phlogopite*.

Brammallite

A reasoning similar to that concerning *illite* has led the Subcommittee to list it as a series name. A more precise end-member nomenclature might develop at a later time.

Divisions within the interlayer-deficient micas

In the subgroup of interlayer-deficient micas, some divisions comply with Nickel's (1992)

TABLE 1. True micas: end-member formulae and typical ranges for mineral species (species that are not end-members are denoted with an asterisk)

Dioctahedral		**Trioctahedral**	
Muscovite	$KAl_2\square AlSi_3O_{10}(OH)_2$	Annite	$KFe^{2+}_3AlSi_3O_{10}(OH)_2$
	^{iv}Si: 3.0–3.1	Phlogopite	$KMg_3AlSi_3O_{10}(OH)_2$
	^{vi}Al: 1.9–2.0	Siderophyllite	$KFe^{2+}_2AlAl_2Si_2O_{10}(OH)_2$
	K: 0.7–1.0 ($I \geqslant 0.85$)	Eastonite	$KMg_2AlAl_2Si_2O_{10}(OH)_2$
	$^{vi}R^{2+}/(^{vi}R^{2+} + {}^{vi}R^{3+}) < 0.25$	Hendricksite	$KZn_3AlSi_3O_{10}(OH)_2$
	$^{vi}Al/(^{vi}Al + {}^{vi}Fe^{3+})$: 0.5–1.0		$Zn > 1.5$
Aluminoceladonite		Montdorite*	$KFe^{2+}_{1.5}Mn^{2+}_{0.5}Mg_{0.5}\square_{0.5}Si_4O_{10}F_2$
	$K\,Al(Mg,Fe^{2+})\square Si_4O_{10}(OH)_2$		$Fe^{2+} > Mn^{2+} + Mg$
	$^{vi}R^{2+}/(^{vi}R^{2+} + {}^{vi}R^{3+}) \geqslant 0.25$	Tainiolite	$KLiMg_2Si_4O_{10}F_2$
	$^{vi}Al/(^{vi}Al + {}^{vi}Fe^{3+})$: 0.5–1.0	Polylithionite	$KLi_2AlSi_4O_{10}F_2$
	$Mg/(Mg + {}^{vi}Fe^{2+}) > 0.5$	Trilithionite *	$KLi_{1.5}Al_{1.5}AlSi_3O_{10}F_2$
Ferro-aluminoceladonite		Masutomilite	$KLiAlMn^{2+}AlSi_3O_{10}F_2$
	$KAl(Fe^{2+},Mg)\square Si_4O_{10}(OH)_2$		Mn^{2+}: 1.0–0.5
	$^{vi}Al/(^{vi}Al + {}^{vi}Fe^{3+})$: 0.5–1.0		Li: 1.0–1.5
	$Mg/(Mg + {}^{vi}Fe^{2+}) \leqslant 0.5$		Si: 3.0–3.5
Celadonite	$KFe^{3+}(Mg,Fe^{2+})\square Si_4O_{10}(OH)_2$		^{iv}Al: 1.0–0.5
	$^{vi}R^{2+}/(^{vi}R^{2+} + {}^{vi}R^{3+}) \geqslant 0.25$	Norrishite	$KLiMn^{3+}_2Si_4O_{12}$
	$^{vi}Al/(^{vi}Al + {}^{vi}Fe^{3+}) < 0.5$	Tetra-ferri-annite	$KFe^{2+}_3Fe^{3+}Si_3O_{10}(OH)_2$
	$Mg/(Mg + {}^{vi}Fe^{2+}) > 0.5$	Tetra-ferriphlogopite	
Ferroceladonite	$KFe^{3+}(Fe^{2+},Mg)\square Si_4O_{10}(OH)_2$		$KMg_3Fe^{3+}Si_3O_{10}(OH)_2$
	$^{vi}Al/(^{vi}Al + {}^{vi}Fe^{3+}) < 0.5$	Aspidolite	$NaMg_3AlSi_3O_{10}(OH)_2$
	$Mg/(Mg + {}^{vi}Fe^{2+}) \leqslant 0.5$	Preiswerkite	$NaMg_2AlAl_2Si_2O_{10}(OH)_2$
Roscoelite	$KV_2\square AlSi_3O_{10}(OH)_2$	Ephesite	$NaLiAl_2Al_2Si_2O_{10}(OH)_2$
Chromphyllite	$KCr_2\square AlSi_3O_{10}(OH,F)_2$		
Boromuscovite	$KAl_2\square BSi_3O_{10}(OH)_2$		
Paragonite	$NaAl_2\square AlSi_3O_{10}(OH)_2$		
	$K < 0.15$		
	$Ca < 0.11$		
Nanpingite	$CsAl_2\square AlSi_3O_{10}(OH)_2$		
Tobelite	$(NH_4)Al_2\square AlSi_3O_{10}(OH)_2$		

Nomenclature for mineral solid solutions, but some do not. The non-50% limits adopted by the Subcommittee as divides between volumes in interlayer-deficient micas are essentially those of Bailey *et al.* (1979).

Illite

This name has been used relatively vaguely, and the Subcommittee found it suitable as a series name for a relatively large volume in compositional space, as a counterpart to *glauconite.*

Interlayer-deficient micas versus *hydromicas*

The Subcommittee was unable to find any *hydromica* that has an excess of water over the equivalent of $(OH,F)_2$ and could not be interpreted as a *mixed-layer structure* (such as biotite-vermiculite, illite-smectite). At the same time, all micas described as *hydromicas* exhibit a deficiency in the interlayer cation position. Accordingly, the Subcommittee voted to abandon the subgroup name *hydromicas* and replace it with *interlayer-cation-deficient micas* or, in an abbreviated form, *interlayer-deficient micas.*

Phengite

Phengite was elevated to a series name for solid solutions between muscovite, aluminoceladonite, and celadonite.

Species that are not end-members

The Subcommittee voted to consider as end members only formulae that are stoichiometric on the scale of the asymmetric part of the unit cell. This principle ruled out a number of micas;

TABLE 2. Brittle micas: end-member formulae and typical ranges for mineral species

Dioctahedral	
Margarite	$CaAl_2\square Al_2Si_2O_{10}(OH)_2$ I = Ca, Na M = Al, Li, $\square$ > Li T = Al, Si, Be
Chernykhite	$BaV_2\square Al_2Si_2O_{10}(OH)_2$ M: V, Al, Fe, Mg
Trioctahedral	
Clintonite	$CaMg_2AlAl_3SiO_{10}(OH)_2$ I = Ca, Na, K M = Mg, Fe^{2+}, Al, Fe^{3+}, Mn T = Al, Si, Fe^{3+}
Bityite	$CaLiAl_2BeAlSi_2O_{10}(OH)_2$ $^{vi}Li > {}^{vi}\square$
Anandite	$BaFe^{2+}_3Fe^{3+}Si_3O_{10}S(OH)$ I: Ba, K, Na M: Fe^{2+}, Mg, Fe^{3+}, Mn, Al A: S > OH, Cl, F
Kinoshitalite	$BaMg_3Al_2Si_2O_{10}(OH)_2$ I: Ba + K ~ 1.0 M: Mg, Mn^{2+}, Mn^{3+}, Al, Fe, Ti A: OH, F

the Subcommittee decided it would be best to refer to non-stoichiometric micas that have a fairly constant and recurring composition as *'species that are not end-members'*. The micas so designated are *montdorite, trilithionite, wonesite.*

Synonyms (s) and varieties (v)

The list is based on tabulations of Heinrich *et al.* (1953) and Hey (1962, 1963), modified and supplemented. Labels '(s)' or '(v)' could only be attached where there was sufficient information. If a series name appears to the right of a variety rather than a species name, it is because no more precise information is available.

Tainiolite

The *Subcommittee* prefers the original spelling *tainiolite* to *taeniolite.* The spelling of Flink (1899) was based on Greek words *ταινία* (a band or strip) and *λίθος* (a stone). It should be noted that the Russian spelling has always been *tainiolit.*

Tetra-ferri-annite

Inasmuch as Wahl's (1925) analyses do not make the case for $^{iv}Fe^{3+}$ strong enough, his *monrepite* was rejected as an end-member, with *tetra-ferri-*

TABLE 3. Interlayer-deficient micas: representative formulae and ranges (the asterisk indicates species that is not an end-member)

Dioctahedral[1]	
Idealized general formula	$(K,Na)_{x+y}(Mg,Fe^{2+})_x(Al,Fe^{3+})_{2-x}\square Si_{4-y}(Al,Fe^{3+})_yO_{10}(OH)_2$ $0.6 \leqslant x+y < 0.85$ $Mg > Fe^{2+}$ $^{iv}Al > {}^{iv}Fe^{3+}$
Illite (a series name)	$K_{0.65}Al_{2.0}\square Al_{0.65}Si_{3.35}O_{10}(OH)_2$ $^{vi}R^{2+}/(^{vi}R^{2+} + {}^{vi}R^{3+}) \leqslant 0.25$ $^{vi}Al/(^{vi}Al + {}^{vi}Fe^{3+}) \geqslant 0.6$
Glauconite (a series name)	$K_{0.8}R^{3+}_{1.33}R^{2+}_{0.67}\square Al_{0.13}Si_{3.87}O_{10}(OH)_2$ $^{vi}R^{2+}/(^{vi}R^{2+} + {}^{vi}R^{3+}) \geqslant 0.15$ $^{vi}Al/(^{vi}Al + {}^{vi}Fe^{3+}) \leqslant 0.5$
Brammallite (a series name)	$Na_{0.65}Al_{2.0}\square Al_{0.65}Si_{3.35}O_{10}(OH)_2$
Trioctahedral	
Wonesite*	$Na_{0.5}\square_{0.5}Mg_{2.5}Al_{0.5}AlSi_3O_{10}(OH)_2$

[1] See also Fig. 1; I = $x + y$

annite taking its place. Parallel with it is the name *tetra-ferriphlogopite*.

Acknowledgements

Since its establishment in 1976, the Mica Subcommittee benefited from, and is indebted for, ideas offered by a large number of mineralogists; there were so many of them that they cannot be acknowledged individually. The votings on the nomenclature in the CNMMN, I.M.A., and the handling of associated problems was facilitated thanks to the expertise of Joel D. Grice and Bill D. Birch. We thank Charlie V. Guidotti and Robert F. Martin for valuable final comments on the text and tables.

TABLE 4. Series names

Biotite	Trioctahedral micas between, or close to, the annite-phlogopite and siderophyllite-eastonite joins; dark micas without lithium
Glauconite	Dioctahedral interlayer-deficient micas with composition defined in Table 3
Illite	Dioctahedral interlayer-deficient micas with composition defined in Table 3
Lepidolite	Trioctahedral micas on, or close to, the trilithionite-polylithionite join; light micas with substantial lithium
Phengite	Potassic dioctahedral micas between, or close to, the joins muscovite-aluminoceladonite and muscovite-celadonite
Zinnwaldite	Trioctahedral micas on, or close to, the siderophyllite-polylithionite join; dark micas containing lithium

Hendricksite, chernykhite, montdorite, and *masutomilite should be added to these names* if future research substantiates the existence of solid solutions terminated by two end members, such as $KZn_3AlSi_3O_{10}(OH)_2$ and $KMn_3^{2+}AlSi_3O_{10}(OH)_2$. The first of those, now listed as end-member hendricksite, should then be renamed to 'zincohendricksite', the second should become 'manganohendricksite'. The same pattern should apply in all cases given.

TABLE 5. Synonyms (s) and varieties (v)

Names in the left column should be abandoned in favour of those in the right. No symbol in parentheses indicates cases where it could not be decided whether it is a synonym or a variety.

adamsite	muscovite
alurgite(v)	manganoan muscovite, manganoan illite
ammochrysos	muscovite
ammonium hydromica (s)	tobelite
ammonium muscovite (s)	tobelite
amphilogite (s)	muscovite
anomite	biotite
astrolite(s)	muscovite
barium phlogopite (v)	phlogopite
barytbiotite (v)	phlogopite
biaxial mica	muscovite
bowleyite (s)	bityite
brandisite (v)	clintonite
bronzite (Finch) (v)	clintonite
caesium-biotite (v)	biotite
calciobiotite (v)	biotite
calciotalc (v)	clintonite
cat gold	muscovite
cat silver	muscovite
chacaltocite	muscovite
chlorophanerite	glauconite

TABLE 5. (*contd.*)

chrombiotite (v)	biotite
chrome mica (s)	chromian muscovite, chromian phengite
Chromglimmer (s)	chromian muscovite, chromian phengite
chromochre	chromian muscovite
chrysophane	clintonite
clingmanite (s)	margarite
colomite	roscoelite
common mica	muscovite
corundellite (s)	margarite
cossaite(v)	paragonite
cryophyllite (v)	zinnwaldite, ferroan trilithionite, ferroan polylithionite
damourite	muscovite
didrimite	muscovite
didymite	muscovite
diphanite (s)	margarite
disterrite(v)	clintonite
dysintribite	muscovite
emerylite (s)	margarite
euchlorite (s)	biotite
ferriannite (s)	tetra-ferri-annite
ferribiotite (v)	biotite
ferri-phengite (v)	ferrian muscovite
ferriphlogopite (v)	ferrian phlogopite, tetra-ferriphlogopite
ferrititanbiotite (v)	biotite
ferriwodanite (v)	biotite
ferriwotanite (v)	biotite
ferroferrimargarite (v)	margarite
ferro-ferri-muscovite (s)	ferrian annite
ferromuscovite (v)	biotite
ferro-phlogopite (v)	ferroan phlogopite
ferrophlogopite (v)	ferroan phlogopite
flogopite (s)	phlogopite
fluortainiolite (s)	tainiolite
Frauenglas	muscovite
fuchsite	chromian muscovite
gaebhardite[1]	chromian muscovite
gilbertite	muscovite
goeschwitzite	illite
grundite	illite
gümbellite	illite-$2M_2$
haughtonite (v)	biotite
heterophyllite (v)	biotite
holmesite	clintonite
holmite	clintonite
hydromicas (s)	interlayer-deficient micas
hydromuscovite	illite
hydroparagonite (s)	brammallite
hydroxyl-annite(s)	annite
hydroxyl-biotite (s)	biotite
iron-sericite (v)	ferrian illite
iron mica[2]	annite, siderophyllite, biotite
irvingite (v)	lithian muscovite

[1]The mineral *gebhardite* has the formula $Pb_8O(As_2O_5)_2Cl_6$
[2] Also used for hematite

TABLE 5. (*contd.*)

Isinglas	muscovite
Kaliglimmer	muscovite
killinite	illite
kmaite (s)	celadonite, ferrian celadonite
lepidomelane (v)	annite, siderophyllite, tetra-ferri-annite, biotite
lepidomorphite	phengite
leucophyllite (s)	aluminoceladonite
lilalite (s)	lepidolite
Lilalith (s)	lepidolite
lime mica (s)	margarite
lithia mica (s)	lepidolite, zinnwaldite
Lithioneisenglimmer (s)	zinnwaldite
Lithionglimmer (s)	lepidolite
Lithionit (s)	lepidolite
lithionite (s)	lepidolite
lithionitesilicat (s)	lepidolite
lithium muscovite (s)	trilithionite, lithian muscovite
lithium phengite (v)	lithian muscovite
macrolepidolite(s)	lepidolite
magnesia mica (s)	phlogopite
magnesiomargarite (v)	clintonite
magnesium sericite (v)	magnesian illite
manganese mica (v)	biotite
manganese muscovite	manganoan muscovite
manganglauconite (v)	glauconite
mangan-muscovite	manganoan muscovite
manganmuscovite	manganoan muscovite
manganophyll (v)	biotite
manganophyllite (v)	biotite
manganphlogopite (v)	manganoan phlogopite
margarodite	muscovite
Marienglas	muscovite
mariposite (s)	chromian phengite, chromian muscovite
marsjatskite	glauconite
marsyatskite	glauconite
meroxene (v)	biotite
metasericite	muscovite
microlepidolite	lepidolite
monrepite (s)	ferrian annite
Na brittle mica (s)	preiswerkite
Na-eastonite (s)	preiswerkite
nacrite (Thomson) (s)	muscovite
natrium illite (s)	brammallite
natro-alumobiotite (v)	biotite, sodian siderophyllite
natro-ferrophlogopite (v)	biotite, sodian phlogopite
natronbiotite (v)	biotite
natronphlogopite (v)	sodian phlogopite
natronmargarite (s)	calcic paragonite, calcic ephesite
nickel phlogopite (v)	nickeloan phlogopite
oblique mica	muscovite
odenite	biotite
Odinit	biotite
Odith	biotite
oellacherite	barian muscovite
oncophyllite	muscovite
Onkophyllit	muscovite

TABLE 5. (*contd.*)

paucilithionite (s)	trilithionite
pearl-mica(s)	margarite
Perlglimmer (s)	margarite
picrophengite (v)	magnesian muscovite
poly-irvingite(v)	lepidolite
potash margarite (v)	margarite
potash mica	muscovite
pregrattite (s)	paragonite
protolithionite (v)	zinnwaldite, lithian annite, lithian siderophyllite
pycnophyllite	fine-grained muscovite or illite
Pyknophyllit	fine-grained muscovite or illite
Rabenglimmer (s)	zinnwaldite
Rhombenglimmer (v)	phlogopite, biotite
rhombic mica (v)	phlogopite, biotite
sandbergite	barian muscovite
sarospatakite	illite
scale stone (s)	lepidolite
schernikite	muscovite
Schuppenstein (s)	lepidolite
seladonite (s)	celadonite
seybertite (v)	clintonite
shilkinite (v)	ferroan muscovite, ferroan illite
siderischer-Fels-Glimmer (s)	lepidolite
skolite (s)	glauconite
soda glauconite (v)	glauconite
soda margarite (s)	calcic paragonite, calcic ephesite
soda mica (s)	paragonite
sodium illite (s)	brammallite
sodium phlogopite (s)	aspidolite
sterlingite	muscovite
svitalskite (v)	celadonite
taeniolite (s)	tainiolite
talcite	muscovite
titanbiotite (v)	biotite
Titanglimmer (v)	biotite
titanmica (v)	biotite
titanobiotite (v)	biotite
valuevite (v)	clintonite
vanadium mica (s)	roscoelite
Vanadinglimmer (s)	roscoelite
verdite	chromian muscovite
Verona earth (s)	celadonite
veronite (s)	celadonite
voron'ya slyuda (v)[3]	zinnwaldite, lithian annite, lithian siderophyllite
walouewite (v)	clintonite
waluewite (v)	clintonite
Walujewit (v)	clintonite
wodanite (v)	biotite
wotanite (v)	biotite
xanthophyllite (v)	clintonite
zweiaxiger Glimmer	muscovite

[3] 'Raven mica' or 'crow mica' in Russian

TABLE 6. Ill-defined materials and mixtures. Usage of these names is discouraged unless the ill-defined micas are substantitated by new research

achlusite	a sodium mica?
antrophyllite	a mica?
avalite	chromian illite or a mineral mixture
baddeckite	muscovite and hematite
bardolite	interstratified biotite and vermiculite?
basonite	interstratified biotite and vermiculite
bastonite	interstratified biotite and vermiculite
bravaisite	illite and montmorillonite
buldymite	biotite and vermiculite or interlayer-deficient biotite
caswellite	mica and manganoan andradite
cataspilite	alteration product with dominant muscovite
catlinite	muscovite and pyrophyllite
chacaltaite	illite pseudomorph after cordierite
cymatolite	muscovite and albite
dudleyite	a smectite?
ekmanite	a smectite?
epichlorite	an altered chlorite?
epileucite	muscovite and K-feldspar pseudomorph after cordierite
episericite	illite?
eukamptite	altered biotite
euphyllite	paragonite and muscovite or paragonite
gigantolite	muscovite and cordierite
hallerite	paragonite and lithian muscovite
helvetan	decomposed biotite
hexagonal mica	a mica?
hydrophlogopite	interstratified phlogopite and vermiculite
hydropolylithionite	an altered lepidolite?
iberite	altered cordierite and zeolite
ivigtite	muscovite? sodian ferruginous mica?
kryptotile	probably not a mica
ledikite	interstratified biotite and vermiculite
lesleyite	a variety of margarite or a mineral mixture
leverrierite	probably not a mica
mahadevite	an Al-rich biotite?
Melanglimmer	biotite? stilpnomelane? cronstedtite?
metabiotite	weathering product of biotite
Mg-illite-hydromica	interstratified phlogopite and vermiculite
minguetite	interstratified biotite and vermiculite?
oncosine	muscovite $\pm$ quartz $\pm$ other phases
Onkosin	muscovite $\pm$ quartz $\pm$ other phases
onkosine	muscovite $\pm$ quartz $\pm$ other phases
pattersonite	interstratified biotite and vermiculite
philadelphite	decomposition product of biotite, a vermiculite?
pholidolite	phlogopite? saponite?
pinite	pseudomorph mostly of mica after cordierite, nepheline, or scapolite
pseudobiotite	interstratified biotite and vermiculite or interlayer-deficient biotite
pterolite	decomposition product of hornblende consisting of mica and alkali pyroxene
rastolyte	altered biotite or interlayer-deficient biotite
rubellan	altered biotite or interlayer-deficient biotite, vermiculite?
sericite	fine-grained aggregate of mica-like phases
spodiophyllite	possibly a mica related to tainiolite
trioctahedral illite	interstratified biotite and vermiculite
uniaxial mica	a biotite?
vaalite	a vermiculite?
voigtite	weathering product of biotite or interlayer-deficient biotite
waddoite	a mica?

TABLE 7. Names formerly or erroneously used for micas[1]

agalmatolite	pyrophyllite or a mixture with dominant pyrophyllite
allevardite	rectorite
bannisterite	related to islandlike modulated 2:1 layer silicates
Bildstein	pyrophyllite or a mixture with dominant pyrophyllite
chalcodite	stilpnomelane
Fe muscovite	invalid name, hypothetical end member
ferrimuscovite	invalid name, hypothetical end member
ferrophengite	invalid name, hypothetical end member
ferrostilpnomelane	stilpnomelane
ganophyllite	modulated 2:1 layer silicate
hydrobiotite	regular 1:1 interstratification of biotite and vermiculite
iron muscovite	invalid name, hypothetical end member
kerrite	vermiculite
maconite	related to related to vermiculite
manandonite	boron-rich serpentine
pagodite	pyrophyllite or a mixture with dominant pyrophyllite
parsettensite	modulated 2:1 layer silicate
stilpnochlorane	nontronite
tarasovite	regular 3:1 interstratification of dioctahedral mica and smectite

[1] Names in the left column are not to be necessarily considered discredited.

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