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ASSOCIATION INTERNATIONALE POUR L'ETUDE DES ARGILES - INTERNATIONAL ASSOCIATION FOR THE STUDY OF CLAYS - INTERNATIONALE VEREINIGUNG ZUM STUDIUM DER TONE - МЕЖДУНАРОДНАЯ АССОЦИАЦИЯ ПО ИЗУЧЕНИЮ ГЛИН

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REPORT OF AIPEA NOMENCLATURE COMMITTEE*
(Illite. - Glauconite. - Volkonskoite).

* A report of the AIPEA Nomenclature Committee prepared by S.W. Bailey after the meeting held in Denver (USA) during the 8[th] International Clay Conference.

REPORT OF AIPEA NOMENCLATURE COMMITTEE

ILLITE

The name illite was proposed by Grim *et al.* (1937) as a general term for the micaceous clay mineral constituents in argillaceous sediments. The name is widely used, and no change is suggested for cases where the exact nature of the micaceous constituent is not known. Illite may be used as a general name either for a discrete non-expansible mica of detrital or authigenic origin or for the micaceous component of interstratified systems, as in illite-smectite.

There is increasing evidence that an important constituent of argillaceous specimens is a diagenetic dioctahedral mica of composition similar to muscovite but sufficiently different that a species name is now warranted (Bailey *et al.*, 1984). The eventual designation of a specific name was anticipated by Grim *et al.* (1937) in their original description. Because of the wide acceptance of illite as a general term, it is recommended that the same name be retained for the species. But it is very important to avoid confusing the two usages. Because specimens that meet the species definition are believed to be rare (at present), most people will continue to use illite as a general term. Where reference is to be made to the *species* illite, a clear statement should be made to that effect in order to avoid confusion with the *general* usage.

It is expected that the definition of the species illite will evolve with time as our knowledge increases. Środoń and Eberl (1984) have summarized the present state of knowledge of the composition and properties of species illite. The committee recommends that for the present the *species* illite meet the following requirements: (1) The micaceous layers ideally are non-expansible; (2) The octahedral sheet is dioctahedral and aluminous; (3) The interlayer cation is primarily K; and (4) The composition deviates from that of muscovite in two main ways:

(a) $Si^{IV} + (Mg,Fe^{2+})^{VI} \rightarrow Al^{IV} + Al^{VI}$

(b) $Si^{IV} + (\square,H_2O)^{XII} \rightarrow Al^{IV} + K^{XII}$

The maximum layer charge is about -0.8 according to extrapolation of the data of Hower and Mowatt (1966), but may go as high as -0.9. The minimum charge that is permissible without leading to expansibility is uncertain, but is probably near -0.6. A representative formula for the *species* illite is $K_{0.75}(Al_{1.75}R^{2+}_{0.25})(Si_{3.50}Al_{0.50})O_{10}(OH)_2$. This formula, in which the two substitutions above have been made equal, is in general accord with the selected analyses of Weaver and Pollard (1973), but is not intended to be precise because the exact limits of variation are not yet known.

It should be noted that a non-expansible mica species *wonesite* with a layer charge of only -0.5 has recently been reported (Spear *et al.*, 1981). In order to include wonesite, species illite, and species glauconite within the mica group it is necessary to change the layer charge for mica in the AIPEA Classification Scheme (Bailey, 1980) to the range $\underline{x} \cong 0.5-1.0$. Occasional references have been made in the literature to a trioctahedral K-illite (ledikite) and a dioctahedral Na-illite (brammalite). More information is desirable for thse specimens in order to determine their true nature.

GLAUCONITE

This committee (Bailey, 1980) has previously defined the species celadonite and the species glauconite to be in general accord with the findings of Buckley et al. (1978). The division between celadonite and glauconite was placed at tetrahedral $R^{3+} = 0.2$ atoms and octahedral $R^{3+} = 1.2$ atoms, with celadonite having smaller values and glauconite having larger values. That definition is modified here to incorporate the data of Köster (1982) that suggest that the total charge on the octahedral cations is the major discriminant between the two species, and that a total charge of +5.3 serve as the boundary. Note that ideal celadonite $K(R^{2+}_{1.0}R^{3+}_{1.0})Si_{4.0}O_{10}(OH)_2$ would have an octahedral cation charge of +5.0.

The committee agrees with the statement of Bailey et al. (1984) that the species glauconite and the 10Å micaceous layers in glauconite pellets do not have interlayer charges of +1.0. Instead, a maximum value of +0.9 is consistent with the studies of Cimbálniková (1971), Kohler and Köster (1976), Buckley et al. (1978), and Köster (1982). The lower limit of interlayer charge in non-expansible specimens is uncertain, but is probably near +0.8.

VOLKONSKOITE

The committee recommends that dioctahedral Cr-rich smectites warrant the species name volkonskoite if Cr is the dominant trivalent octahedral cation present. Smectites with substantial Cr but with Fe^{3+} as the dominant trivalent octahedral cation present should be called chromian nontronite. It should be noted that dioctahedral minerals can partly fill the ideally vacant octahedral site, however, with the result that a divalent or monovalent cation may actually be dominant in the octahedral sheet. A different species name may be appropriate if this dominant cation is unusual, e.g., Cu, Ni, Mn^{2+}, Li, etc.

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