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SUGGESTED TERMINOLOGY FOR INTERSTRATIFIED CLAY MINERALS

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ABSTRACT

It is suggested that regularly interstratified clay minerals be referred to by descriptive terms—for example, *2-2 mica-montmorillonite* for a regular alternation of two mica layers with two montmorillonite layers—rather than by specific names such as rectorite, allevardite, etc. However, specific names already in use should be retained. Random intergrowths may be referred to as, for example, *30–70 mica-montmorillonite*, the hyphenated numbers referring to the relative percentage of each in the intergrowth. For random intergrowths in which the relative proportions are but poorly known, the less quantitative terms already in use—for example, chloritic-mica (mica predominates), chlorite-mica (approximately equal proportions), etc.—will suffice. As truly quantitative, routine techniques are developed for determining the percentages of components in a random intergrowth, then the hyphenated-percentage method of referral can displace the less quantitative method currently in use.

For all regularly interstratified clay minerals, the Sub-committee on Nomenclature of Clay Minerals for the Clay Minerals Group recommended that a specific name—for example, rectorite, allevardite, etc.—be established (Brown, 1955). For random interstratifications, they recommend that the material be somewhat qualitatively described in terms of the component layers. To illustrate this latter, a material consisting of mica layers in which a small proportion of chlorite layers were randomly interstratified would be called a chloritic-mica. Had these two randomly interstratified layer types been in nearly equal proportions, the name chlorite-mica would be used.

In discussing interstratified clay minerals, MacEwan *et al.* (1961) cite the convenience of indicating " . . . the proportions of the components, where these are known, by a prefixed ratio, as for example in the descriptions '1:1 regular mica-montmorillonite interstratification' [or] '2:1 random mica-montmorillonite interstratification.'" They point out that it is important not to confuse the terms 1:1 and 2:1 with the identical terms respectively used to indicate a kaolinite-type layer and a mica-type layer.

With slight modification, this suggestion by MacEwan *et al.* can be adopted to a specific name for regular interstratifications. It is thus suggested that hyphenated integers be used to indicate the sequence of the component-layers in a regular stacking. Thus *1–1 mica-montmorillonite* would equate to the "1:1 regular mica-montmorillonite interstratification" of MacEwan *et al.* and could well serve as the mineral's name. On the other hand, hyphenated percentages would be used to indicate the relative proportions, where these are known, of the component-layers in

a random stacking. Thus *67–33 mica-montmorillonite* would equate to a "2:1 random mica-montmorillonite interstratification." Similarly *50–50 mica-montmorillonite* signifies what MacEwan *et al.* would call a 1:1 random mica-montmorillonite interstratification. The use of hyphens in this proposed modification avoids confusion with the terms 1:1 and 2:1 as used for kaolin- or mica-type layers. A random stacking is clearly differentiated from a regular stacking because the hyphenated numbers describing it (*a*) will usually each be two-digit numbers and (*b*) will invariably total 100. In random interstratifications where the relative proportions of components are only poorly known, recourse may be had to the less quantitative terms chloritic-mica, chlorite-mica, etc., as previously proposed. As methods for quantitatively determining the proportion of components in a random interstratification are developed, terms such as *25–75 chlorite-mica* or *50–50 chlorite-mica* could be used increasingly in the future.

By the present suggestion, therefore, a *3–3 mica-montmorillonite*, if such existed, would indicate a regular stacking sequence of three mica-like layers alternating with three montmorillonite-like layers. Similarly, rectorite, as defined by Bradley and Weaver (1956) would be described as *1–1 pyrophyllite-vermiculite* or, using Bradley's (1950) description, as *2–2 pyrophyllite-water*. This latter would signify that two pyrophyllite layers and two water layers regularly alternate. Similarly, allevardite, air dried and in its natural state, could be described as *2–2 muscovite-water*. Immersed in water it becomes *2–3 muscovite-water*, the water layers increasing to three. The regularly interstratified montmorillonite-chlorite described by Earley *et al.* (1956) would, under the proposed nomenclature, be called *1–1 montmorillonite-chlorite*.[1]

A case might arise wherein a layer of mica structure, *having at its center the sheet of* K^+ *sites*, may alternate with a layer of montmorillonite, *having at its center the* nH_2O *sites*. In this event the name *1–1 mica-montmorillonite* might be less satisfactory because it conveys the idea of an interlayering of conventional mica and montmorillonite layers—that is, of a mica layer bounded above and below by K^+ sites alternating with a montmorillonite layer bounded above and below by Na^+ and Ca^+ sites. Possibly a special name should be used for such cases or else a name such as *i–i mica-montmorillonite*. The hyphenated *i*'s would indicate an alternation between what is conventionally regarded as an interlayer environment of mica with an interlayer environment of montmorillonite. There

[1] Earley, *et al.* (1956) refrained from assigning a specific name to this regular intergrowth.

is, of course, a limit to the amount of information that a name can conveniently convey and therefore of the utility which can be demanded of it. Thus ambiguities may arise under the proposed nomenclature. On the other hand a special name imparts no information at all until its original definition has been read and memorized.

In summary, the establishment of a specific name for each different type of regular interstratification of two or more clay minerals, as proposed by the Sub-committee on Nomenclature of Clay Minerals for the Clay Minerals Group, has the advantage of conciseness. However, as the study of regularly interstratified clay minerals proceeds, the practice may result in the addition of a number of new, not particularly descriptive, mineral names. This disadvantage seems to outweigh the advantages because it is likely that reference to such regular interstratifications will be occasional rather than extensive. Thus, longer but more descriptive terms may be, in the long run, more advantageous than concise, nondescriptive names for the regular interstratifications between two or more clay minerals. It is proposed therefore that, unless it is exceedingly inconvenient or misleading to do so, regular interstratifications of clay minerals will in the future be referred to by the suggested terms. Specific names now in use should, of course, be retained.

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