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# The Nature of Interlayering in Mixed-Layer Illite-Montmorillonites

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**Abstract:** The nature of interstratification in mixed-layer illite-montmorillonites has been investigated by comparison of diffraction patterns of ethylene glycol and ethylene glycol monoethyl ether treated samples with calculated one-dimensional diffraction profiles. The calculated profiles take into account the effects of particle size distribution, chemical composition, and convolution factors as well as proportions of layers and interstratification type. On the basis of detailed matching of diffraction patterns of monomineralic illite-montmorillonites of known chemical composition it is concluded that there are three types of interstratification: (1) random, (2) allevardite-like ordering, and (3) super-lattice units consisting of three illite and one montmorillonite layers (IMII). By comparison of suites of calculated profiles with the diffraction patterns of many samples of illite-montmorillonites it is concluded that virtually all illite-montmorillonites with expandabilities from about 40 to 100 per cent are randomly interstratified (allevardite being exceptional); at <40 per cent montmorillonite layers they almost always have ordered interstratification. Allevardite-like ordering predominates in illite-montmorillonites which have ordered interstratification, with the IMII superlattice varieties confined to samples with about 10 per cent montmorillonite layers.

*Clays and Clay Minerals*; May 1970 v. 18; no. 1; p. 25-36; DOI: [10.1346/CCMN.1970.0180104](https://doi.org/10.1346/CCMN.1970.0180104)

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