Expansion of Smectite by Laurylamine Hydrochloride: Ambiguities in Transmission Electron Microscope Observations[1]

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Abstract: Treatment of smectite with laurylamine hydrochloride was verified to cause expansion of d(001) which may be retained and observed in ion-milled samples by transmission electron microscopy. The spacings between layers as observed in lattice fringe images, however, are variable and may be as small as 10 Å. The method therefore produces ambiguities in differentiating between some smectites and illites, similar to those that have been found for untreated samples; e.g., on this basis, expanded layers may be inferred to be smectite, but layers with d-values approaching 10 Å may be either illite or smectite. Expansion also destroys the original rock texture, which, therefore, must be observed using only untreated samples.

Key Words: Expansion • Illite • Lattice fringe images • Laurylamine hydrochloride • Smectite • Transmission electron microscopy

Clays and Clay Minerals; February 1986 v. 34; no. 1; p. 69-73; DOI: 10.1346/CCMN.1986.0340108

Clay Minerals Society (www.clays.org)