X-ray Diffraction Band Profiles of Montmorillonite—Influence of Hydration and of the Exchangeable Cations

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Abstract: Previous studies of diffraction band profiles of montmorillonite are extended to the 13, 20 band which, for reasons discussed, is more sensitive to structural details than the diffraction bands considered previously. Hydration of Na-montmorillonite produces appreciable sharpening of this band, indicating, contrary to previous results, that the water layers have at least a partially ordered arrangement. For Cs-montmorillonite, the single water layer hydrate shows only a small sharpening of the band profile, possibly attributable to the water layer, but which clearly indicates that the Cs ions cannot be significantly displaced from their positions in the anhydrous material. For Ba-montmorillonite, the two-layer hydrate shows a small broadening of the diffraction band, which is possibly the result of a partial ordering of the water layers together with a movement of the Ba ions away from the hexagonal holes.

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