Exchangeable Cation Distribution in Nickel- and Magnesium-Vermiculites

J. F. Alcover, L. Gatineau and J. Mering

Centre de Rechesche sur les Solides à Organisation Cristalline Imparfaite C.N.R.S. 45-Orléans-02, France

Abstract: Abnormal scatterings of X-rays take place between Bragg spots. Their study in hydrated Mg- and Ni-vermiculites shows that they appear in reciprocal space in the form of modulated lines, elongated along the Z^* axis. These scatterings demonstrate a two-dimensional organization of the compensating cations and of the water molecules in the interlamellar layer. In such ordered domains, the cations are situated at the nodes of a biperiodic centered lattice with parameters $3a,b$.

The distribution of compensating cations must conform with the charge distribution which they neutralize; it can therefore be concluded that the distribution of effective negative charges (tetrahedral negative charges less positive octahedral charges) is also at least partially ordered.

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