
The " Layer Charge" of Regular Interstratified 2:1 Clay Minerals

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Abstract: Alkylammonium ion exchange on mixed-layer minerals gives detailed information about the variation of cation density in succeeding interlayer spaces. Three mixed layer samples from Japan (supplied by Dr. H. Kodama) were investigated. Their nearly 1:1 interstratification is based on regularly alternating high- and low-charged interlayer spaces, which are caused by a regular sequence of polar layers. The cation density in the high-charged interlayer spaces is $>0.8 \text{ eq}/(\text{Si, Al})_4\text{O}_{10}$. The low-charged interlayer spaces have an average cation density of $0.4 \text{ eq}/(\text{Si, Al})_4\text{O}_{10}$ and heterogeneous charge distribution. The kind of heterogeneity of the Goto Mine sample differs from that of the Yonago Mine and the Honami Mine samples.

The Goto Mine specimen has a rather regular sequence of the low- and high-charged interlayers in proportions close to 0.50:0.50. The other two samples contain interlayer spaces with pronounced unsymmetrical charge distribution. The Yonago Mine sample probably has in random distribution with the polar layers about 10% mica-like layers segregated to packets of three and more layers; the ratio of high-charged interlayers to the low-charged ones is increased to about 0.55:0.45. The Honami Mine sample probably contains isolated mica-like layers or pairs of them. The proportion of the high-charged interlayers is estimated to be about 0.53:0.47 and is lower than determined by Kodama from the glycerolated sample.

The samples investigated may be considered as end-members of a series of interstratified specimens which begins with smectites with mixed-layer like charge distribution.

Key Words: Exchange • Hydrous Mica • Interstratification • Mica • Mixed-Layers • Smectite

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