

Chapter 6

Comparison of Dynamic Properties of Intercalated Organocations in Saponite and Tetrasilicicfluormica

Dynamic behavior of intercalated ions is considerably different in saponite and tetrasilicicfluormica. An outstanding example of this difference can be seen in the intercalation compounds of guanidinium ions. In Gu-SP, at least three kinds of motionally different guanidinium ions exist in the temperature region below 380 K: one kind of guanidinium ions is in the rigid state, another rotates around cationic C_3 axis, and the other in the isotropically rotating state. Over a wide temperature range 140-380 K, the former two kinds of guanidinium ions gradually turn into the state of the isotropic rotation, indicating a marked distribution in the motional correlation time in saponite. On the other hand, Gu-MC guanidinium ions are in an almost single motional state in the whole temperature region, implying very small distribution in the motional correlation time in the interlayer space of tetrasilicicfluormica. Another example is exhibited in activation energies for the cationic uniaxial rotation of *n*-alkylammonium ions. In the saponite intercalation compounds, the activation energy for this mode is independent of the carbon number (or molecular length), whereas they are quite different in alkylammonium ions with the carbon number four and eight in the mica intercalation compounds.

These results seem to come from the difference in the homogeneity of the

cationic circumstance governed by the distribution of negative charges in clays and by the uniformity of interlayer distances. Taking into consideration of the results obtained in this study, it can be concluded that the circumstance around intercalated cations is more homogeneous in tetrasilicicfluormica than that in saponite.

In conclusion, the author can say that the dynamic properties of intercalated organocations in the layered clay minerals are much influenced by the nature of host clays.