Chlorite and Illite Compositions from Upper Silurian Rock Salts, Retsof, New York

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Abstract: Chlorite and illite are the major clay minerals in silicate assemblages from a rock salt bed in the Vernon Formation (Upper Silurian) at Retsof, New York. Textural features and Br content of the salt indicate precipitation from shallow marine brine with no subsequent postdepositional recrystallization. Sample mounting procedure for electron microprobe analysis involves clay particle dispersion, sedimentation, and transferral to a planar silver print surface. The 001 face of the flake, rather than the conventional polished plane, constitutes the analyzed surface. Microprobe analysis of the chlorite (80 grains from four samples) yields a mean aggregate Mg-rich clinochlore composition of $(Mg_{4.51}Fe_{0.23}^{2+}Al_{1.21})(Al_{1.09}Si_{2.91})O_{10}(OH)_8$, which is relatively uniform among grains and among samples. Its unique composition when compared with normal shale chlorites suggests an authigenic origin in the marine evaporite environment. Illite (106 grains from five samples) has a mean aggregate composition of $K_{0.85}(Al_{1.61}Fe_{0.20}^{3+}Mg_{0.23})(Al_{0.76}Si_{3.24})O_{10}(OH)_2$ with little variation among samples. The illite is distinctly less degraded than normal shale illite suggesting some recrystallization occurred in the hypersaline environment. Extensive compositional variation among illite flakes within each sample may reflect alteration of several different detrital micaceous minerals. The term *hyperhalmyrolysis* is introduced to denote mineral reactions which occur in the marine hypersaline environment.

Diagenesis effected improved crystallinity and undoubtedly involved isochemical recrystallization of the bulk silicate assemblage. Metasomatism of the assemblage during diagenesis, however, appears to be negligible.

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