
Authigenesis of Kaolinite and Chlorite in Texas Gulf Coast Sediments

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Abstract: Core cuttings from numerous wells traversing Oligocene through Recent sediments of the Texas Gulf Coast were examined with a scanning electron microscope using the back-scattered electron imaging mode (BSE) to ascertain diagenetic changes in clays and associated minerals of mudrocks and of adjacent sandstones. Several occurrences of authigenic kaolinite and chlorite were noted, each characterized by a specific texture and a specific diagenetic microenvironment. In all occurrences kaolinite appears to have formed before chlorite, and in some the kaolinite appears to have precipitated directly from solution. Chlorite, ubiquitously an iron-rich variety, appears to have precipitated in some places directly from solution. It has also been noted pseudomorphous after kaolinite. A progressive decrease in the iron content of mixed-layer illite/smectite with increasing depth is believed to have released the necessary iron and to have driven the kaolinite-to-chlorite reaction.

Key Words: Authigenesis • Back-scattered electron imaging • Chlorite • Illite/smectite • Iron • Kaolinite

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