



Authigenic palygorskite in the Middle Miocene rocks of Iraq: environmental and geochemical indicators.

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Palygorskite is a common authigenic mineral recorded from the lower Miocene Euphrates Formation and the middle Miocene Fat'ha succession from north and north-western Iraq. Marl beds of the Euphrates Formation were deposited in lagoonal, quite saline environment, a suitable one for the neoformation of palygorskite.

The Fat'ha Formation is composed mainly of an evaporitic sequence. It consists of numerous shallowing-upward cycles of alternating mudrocks, limestones, gypsum and/or anhydrite and halite in the basin center. Clay minerals in the mudrocks and in the non-carbonate fractions of the limestones are composed mostly of illite, chlorite, illite, kaolinite and palygorskite. It is believed that most of the clay minerals are detrital in origin, except palygorskite which is formed by authigenesis in evaporitic environments.

The dominance of palygorskite in the claystones of the Fat'ha Formation may reflect the gradual conversion of this mineral from smectite in restricted, evaporitic lagoonal conditions (the major environment in the Fat'ha Formation).

The mineral has a fibrous texture and commonly associated with dolomites and other Mg-rich minerals. SEM photomicrographs show palygorskite as long and small fibers as well as in framboidal shapes indicating their authigenic source. Geochemical analysis of these palygorskite using microprobe analysis shows that they generally have MgO content ranging from 3.5% to 4.8%.