
Palygorskite-Sepiolite Clays of Lebrija, Southern Spain

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Abstract: The Upper Pliocene sediments near Lebrija in southern Spain contain commercial deposits of palygorskite and sepiolite. These sediments of continental origin consist chiefly of carbonate, marl, and clay resting on marine Pliocene quartzose sand. The lowest unit, the " Marly-Calcareous Bed," consists of sepiolite-rich marl associated with concretions and irregular layers of chert, <0.5 m thick, and local diatomite layers, as well as limestone, sandy limestone, marl, and clayey sandstones. This unit has a maximum thickness of 30 m and contains three clay-mineral suites as follows: (1) bottom—sepiolite \pm palygorskite; (2) center—sepiolite and palygorskite \pm illite; (3) top—palygorskite and illite, \pm sepiolite and smectite. Sepiolite decreases and palygorskite and illite increase toward the top, reflecting the composition of detrital material supplied to the basin. Beds 0.5– 1 m thick locally and containing 50 to 60% sepiolite have been called " Tierra del Vino" (wine earth) because the material formerly was used to clarify and purify wine. The sepiolite-rich beds are as much as 15 m thick in the eastern part of the area. The upper unit is called the " Palygorskite Bed" because certain layers, 0.3 to 3 m thick, contain 35 to 75% palygorskite. The palygorskite-rich layers are interbedded with limestone and marl, and the entire unit is 15 m thick. The total resource of palygorskite is estimated at about 9 million tonnes.

The sediments are believed to have been deposited in a brackish, lacustrine environment. Originally, tectonic stability and an arid climate favored the formation of sepiolite at about pH 8. Later, after significant weathering of the source rocks, detrital illite was transformed to palygorskite in the Mg- and Si-rich waters. Here, palygorskite was also precipitated directly.

Key Words: Genesis • Palygorskite • Sedimentation • Sepiolite • Spain

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