
Microtextures and the Origin of Muscovite-Kaolinite Intergrowths in Sandstones of the Utrillas Formation, Basque Cantabrian Basin, Spain

Javier Arostegui¹, María Jesús Irabien¹, Fernando Nieto², Javier Sangüesa¹ and María Cruz Zuluaga¹

¹ Departamento de Mineralogía y Petrología, Facultad de Ciencias, Universidad del País Vasco/E.H.U., Apartado 644, 48080 Bilbao, Spain

² Departamento de Mineralogía y Petrología, Universidad de Granada, 18002 Granada, Spain

E-mail of corresponding author: nppargaj@lg.ehu.es

Abstract: Muscovite-kaolinite intergrowths found in Albian sandstones of the Basque Cantabrian basin (northern Spain) were studied by optical, scanning and electron microscopy and electron microprobe analysis. Kaolinitization begins at grain edges, forming the characteristic fanned-out textures, and propagates toward the interior along the cleavages of muscovite. Kaolinite and muscovite occur as thick packets, being free of interlayering. Phase boundaries between both minerals show bidimensional crystallographic continuity, and no intermediate phases have been identified. The data obtained suggest that muscovite only supplied a template suitable for the epitactic crystallization of kaolinite, while Al was available in sufficient amounts due to the dissolution of detrital K-feldspar. Very small packets of magnetite or maghemite showing a coherent orientation with the kaolinite crystals have been recognized, and could be responsible for the small Fe contents usually detected in electron microprobe analyses of kaolinite.

Textural relationships between authigenic kaolinite and deformation microstructures in the intergrowths, combined with previous information about burial conditions, show that alteration proceeded during a late stage of the diagenetic history, related to the uplift of the studied materials as a result of the Alpine orogeny.

Key Words: Epitactic • Geomechanical Parameters • HRTEM • Muscovite-kaolinite Intergrowth • SEM • Timing

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