
Diagenetic Kaolinite/Dickite (Betic Cordilleras, Spain)

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Abstract: The lower Permo-Triassic sediments of the Maláguide Complex contain abundant dickite. Whole rocks were studied by optical microscopy, scanning electron microscopy, and X-ray powder diffraction. The 2– 20 μm and $< 2 \mu\text{m}$ size fractions were extracted and analyzed by scanning and transmission electron microscopy, X-ray powder diffraction, infrared spectroscopy, differential thermal analysis, and thermogravimetry.

In the coarse-grained samples, the 2– 20 μm size fraction consisted of well-crystallized dickite associated with minor quantities of kaolinite, illite, quartz, and hematite. XRD patterns of the fine-grained samples and the $< 2 \mu\text{m}$ fractions showed the existence of well-crystallized minerals in which several reflections of dickite (11 l , 02 l) were absent and the 132/13 2 $^-$ reflections were shifted. These patterns suggest the presence of an intermediate member between well-crystallized dickite and well-crystallized kaolinite. Only locally high-order reflections are present at 10.5 Å and 18– 22 Å. DTA and IR data agree with those from XRD.

The observed compositional and structural variations are a function of the lithology and the particle size of the sample. The sequence kaolinite \rightarrow kaolinite/dickite \rightarrow dickite is proposed for the development of these materials during Alpine metamorphism.

Key Words: Crystallinity • Dickite • Differential thermal analysis • Electron microscopy • Infrared spectroscopy • Interstratified minerals • Kaolinite • Thermogravimetry • X-ray powder diffraction

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