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What does Berthierine look like in FT-IR?

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Berthierine, a 7Å, iron rich 1:1 clay mineral, part of the kaolin-serpentine series, is known to evolve into Fe-chlorite during burial diagenesis (Aagaard *et al.,* 2000). In turn, the development of chlorite coatings on grain surface inhibits quartz cementation during deep burial, thus preserving porosity in reservoirs (Worden and Morad, 2003). Although the occurrence of Mg-rich diagenetic chlorite is often found in arid continental sandstones, the origin of Fe-rich diagenetic chlorite is still debatable. If Fe-chlorite is derived from a precursor, then the origin of this precursor has to be explained. However, the identification of berthierine in natural samples, using conventional methods (XRD, SEM) is difficult due to low abundances. FT-IR allows identification and quantification of a mineral in a sample even for small quantities of material, but it requires comparison to a standard. This study aims to define a berthierine standard to help identify and quantify this mineral in rocks and sediments and to help with the development of theories to explain the origin and berthierine and Fe-rich clay in sandstones. Samples from Mont St Hilaire (Quebec, Canada), where hydrothermal berthierine occurs were analysed using FT-IR and X-ray diffraction in order to obtain reference curves. They were then compared to synthetic berthierine and ancient sedimentary rocks from Middle Jurassic sandstones from Offshore Norway.

Aagaard, P., Jahren, J.S., Harstad, A.O., Nilsen, O., and Ramm, M. (2000) Formation of grain-coating chlorite in sandstones. Laboratory synthesized vs. natural occurrences. *Clay Minerals*, 35, 261-269.

Worden R.H. and Morad S (2003) Clay minerals in sandstones: a review of the detrital and diagenetic sources and evolution during burial. In (Worden, R.H. and Morad, S. eds.) *Clay mineral cement in sandstones*. International Association of Sedimentologists, Special Publication, v. 34, p. 3-41.