
Mössbauer Study of Transformations Induced in Clay by Firing

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Abstract: The clay fraction of an Attic soil has been fired at temperatures up to 1100° C and the transformations induced by firing were studied by Mössbauer spectroscopy. The unfired clay contained iron in the form of small particles of α -Fe₂O₃ and β -FeOOH and as a substitutional ion in the clay mineral structure. A transformation of β -FeOOH to α -Fe₂O₃ is observed in the region of 200– 400° C followed by dehydroxylation of the clay mineral between 500 and 800° C. A disintegration of the clay mineral structure is inferred above 800° C, followed by recrystallization in an iron-rich phase, most probably in the form of very fine particles. The room temperature spectra of the fired samples indicate that an increase in particle size of the oxides occurs upon firing.

Clays and Clay Minerals; November 1975 v. 23; no. 5; p. 393-399; DOI: [10.1346/CCMN.1975.0230512](https://doi.org/10.1346/CCMN.1975.0230512)

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