THERMAL TREATMENT AND PHASE FORMATION IN ILLITE AND KAOLINITE BASED CLAYS FROM TROPICAL REGIONS OF BOLIVIA

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The aim of this study was to compare the thermal behaviour of clays containing illite and kaolinite in different proportions. The clays contained small amounts of K and Fe, acting as fluxing agents. [1] In order to investigate the phase formations during heating, the samples were run in a DSC from room temperature to 1300°C. The thermal expansion of the different samples was determined by dilatometer measurements from room temperature up to 1100°C. The phase formation was evaluated using XRD and SEM.

In all samples, most of the kaolinite dehydroxylated during heating up to 650°C while illite remained unchanged up to 950°C. There was no influence of the K and Fe content on the dehydroxylation. At temperatures above 950°C metakaolinite formed leading to a spinel-type phase. [2] Furthermore, mullite was formed in the temperature interval 1050°C -1150°C. This range of temperatures for the mullite formation depended on the amount of K and Fe in the samples. It was observed by XRD that most of the illite was transformed into a Si-rich spinel phase at 1050°C, [3] and during further heating transformed into mullite. [4] An increased amount of illite in the clays slightly decreased the melting temperature. The dilatometer measurements showed expansion and shrinkage for the dehydroxylation and spinel-phase formation respectively. [5]

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