

Dehydration kinetics of boehmite and diaspore

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Boehmite and diaspore are polymorphs of AlOOH . Dehydration kinetics of boehmite (H-boehmite), deuterated boehmite (D-boehmite) and diaspore were investigated by thermogravimetric measurements with various heating rates. During dehydration treatments, boehmite and diaspore convert to $\gamma\text{-Al}_2\text{O}_3$ and corundum, respectively. The extent of dehydration as a function of temperature and heating rate was analyzed by integral isoconversional methods proposed in Vyazovkin et al.(2011). Because obtained isoconversional activation energies vary significantly with conversion extent, dehydration processes of these hydrous minerals are dominated by not a single reaction but multiple reaction steps. Comparison between H-boehmite and D-boehmite suggests the early stage of dehydration process is controlled by hydrogen migration from one O-H group to adjacent O-H (formation of adsorbed water molecule). On the other hand, comparison between H-boehmite and diaspore suggests the latter stage of dehydration process is controlled by migration of the adsorbed water molecule.

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