

Formation and distribution of phases during the dehydration of large hydrargillite floccules

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Abstract

© 2015 Pleiades Publishing, Ltd. The phase composition and phase distribution of large floccules of hydrargillite dehydration products obtained by heat treatment at temperatures from 250 to 500°C have been studied by thermal analysis, X-ray diffraction, and IR spectroscopy. Heat treatment in the range 250-300°C leads to the formation of macrocrystalline and microcrystalline boehmite particles. The macrocrystalline boehmite is formed from large hydrargillite crystals. The microcrystalline boehmite results from the "fragmentation" of the hydrargillite crystals. The IR spectra of the samples point to an increase in the number of hydroxyls with $\nu(\text{OH}) = 3471 \text{ cm}^{-1}$ on the lateral faces of the hydrargillite crystals. The crystallite size of the hydrargillite crystals decreases by a factor of 1.8-2.3. In the floccules, a layer of the macrocrystalline boehmite surrounds a microcrystalline boehmite core. The outer surface is covered predominantly with $\chi\text{-Al}_2\text{O}_3$. Heat treatment at $t \chi 350^\circ\text{C}$ leads to $\gamma\text{-Al}_2\text{O}_3$ formation through sequential dehydration of microcrystalline and then macrocrystalline boehmite particles.

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