Crystal Chemistry of Boehmite

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Abstract: Thirty two boehmites, synthesized at temperatures ranging from room temperature to 300 ° C were examined by scanning electron microscopy, transmission electron microscopy, electron diffraction, X-ray powder diffraction, differential thermal analysis, and infrared spectroscopy. The results show that boehmite exhibits a continuous gradation in crystallite size ranging from single octahedral layers or a few unit cells to about 65 unit cells in the y-direction. This conclusion suggests that the term pseudoboehmite is inappropriate for finely crystalline boehmite. Finely crystalline boehmite contains more sorbed water than coarsely crystalline boehmite; this water is commonly intercalated between octahedral layers, usually randomly but sometimes regularly. The regularly interstratified boehmite gives rise to a diffuse " long spacing " X-ray diffraction reflection. Calculated 020 X-ray diffraction peaks approximate closely those observed experimentally when a range of crystallite sizes is taken into account.

Key Words: Boehmite • Crystallite size • Pseudoboehmite • Synthesis • X-ray powder diffraction

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