HYDROTHERMAL TRANSFORMATION OF BOEHMITE NANO-PARTICLES

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Abstract

The hydrothermal transformation of Gibbsite and amorphous Boehmite to well crystallite Boehmite particles is studied in this work. A flow system is employed to produce the crystallite Boehmite particles. The pressure and temperature are ranged from 20 ~ 30 MPa and 250 ~ 300 oC.

The solid content in the feed stream is up to 10 wt%. It is observed that the morphology as well as the crystal structure of the particles changed after the hydrothermal treatment. The particles of Boehmite transformed from Gibbsite are flake and the size is about 800 x 10 nm, and that transformed from amorphous Boehmite are cylinder and the size is about 300 x 60 nm.

It is presumed that the crystallization of the amorphous Boehmite is a fast reaction, because the XRD spectrum shows clear peak. However, the transformation of Gibbsite to Boehmite is a slower process. The XRD spectrum shows that about 15% of the Gibbsite remains untransformed. It is suggested that the reaction time for the transformation of Gibbsite to Boehmite needs to be further extended or the reaction temperature needs to be increased.

This study will provide useful information to optimize the operation conditions to the continuous hydrothermal transformation technology.