KINETICS PARAMETERS OF THE THERMAL DEHYDROXYLATION OF GIBBSITE $Al(OH)_3$ BY DIFFERENTIAL THERMAL ANALYSIS (DTA)

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Abstract

In this present study, the thermal decomposition of gibbsite $Al(OH)_3$ was studied by the Differential Thermal Analysis (DTA) technique under non-isothermal conditions, the gibbsite powder were carried out between room temperature to 900 °C using heating rates of 5, 10, 15 and 20 °C/min.The obtained DTA curves show two different peaks: the first peak is due to partial dehydroxylation of gibbsite and formation of boehmite, the value of the activation energy (E_A) corresponds to 143 KJ/mol. The second peak corresponds to transformation of gibbsite to χ-Al_2O_3 phase, the activation energy (E_A) was found around to 185 KJ/mol. The values of apparent activation were determined by Ozawa–Flynn–Wall (OFW), Boswell and Kissinger–Akahira–Sunose (KAS) methods and by applying the basic solid-state kinetic equations. The phases formed and the structural changes were investigated by differential thermogravimetry (DTG) and X-ray diffraction (XRD) for gibbsite powder treated at different temperatures from room temperature to 1100 °C.

Keywords: Activation energy, Decomposition kinetics, Differential Thermal Analysis (DTA), Gibbsite.