

Auto-ignition reaction characteristics for the preparation of ZnO from citrate precursors

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Characteristics of auto-ignition reaction for the preparations of ZnO powder from citrate precursors were examined to analyze the reaction kinematics. Zinc nitrate and citric acid were chosen as the basic precursors. The ratio of C/N was maintained in a particular level to initiate the self-propagating combustion between the reducing citrate and oxidizing nitrate groups. The gel samples of starting precursors were decomposed thermally by using TGA. The major decomposition of the gel samples was occurred in a very short time with a very sharp intense exotherm, indicating that the self-propagating auto-ignition reaction would occur. Friedman, Ozawa-Flynn-Wall and Vyazovkin methods were employed to predict the reaction order, activation energy and fractional conversion of the reaction. The heating rate in the reaction area was in the range of 5K~40K/min comprising the non-isothermal reaction condition.