



Thermal Decomposition of Ammonium per chlorate: Part-I: Effect of Sample Heating Rate

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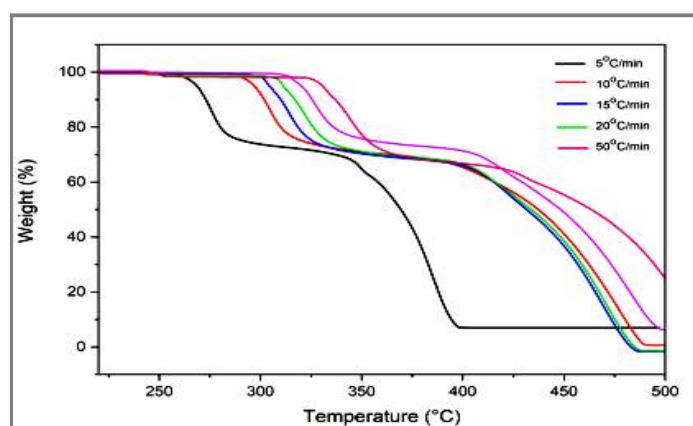
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ABSTRACT

Thermal decomposition (TD) of ammonium per chlorate (AP) is the subject matter of this presentation. Various physical parameters influence the thermal decomposition of ammonium per chlorate. The focus in the present work is on the influence of sample heating rate ($5^{\circ}\text{C min}^{-1}$ to $50^{\circ}\text{C min}^{-1}$) on TD of AP. Thermo-analytical techniques employed in this study include-Thermo gravimetric (TG), Derivative thermo gravimetric (DTG), and Differential Scanning Calorimetry (DSC), in an inert atmosphere of pure nitrogen, at a gas flow rate of 50 mL min^{-1} . As expected, the reaction front moves forward towards higher temperature region with the increase in sample heating rate. At the sample heating rate of $10^{\circ}\text{C min}^{-1}$, the system shows maximum heat release of 623 J g^{-1} attributed to the attainment of system's equilibrium. The observed heat releases at each sample heating rates ($5, 10, 15, 20,$ and $50^{\circ}\text{C min}^{-1}$) are in tune with the reported literature values.

Graphical Abstract



TG-Curves of pure ammonium per chlorate at different heating rates.

Keywords: Ammonium perchlorate, Thermal decomposition, Enthalpy, Heating rate.