



Thermo-Analytical Techniques as useful Quality Control Tools in the Manufacture of Ammonium Per chlorate

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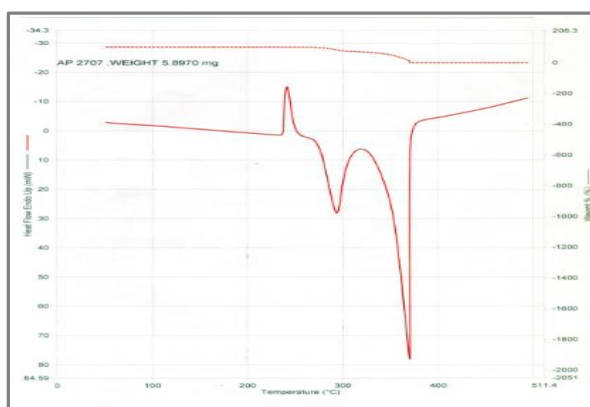
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ABSTRACT

The utility of thermo-analytical techniques as production quality control tools in the manufacture of ammonium per chlorate is discussed. A random selection of three production batches (Batch capacity of 2 Tons batch⁻¹) were selected and studied employing thermo gravimetric (TG) and differential scanning calorimetric (DSC) methods. The endothermic enthalpies of crystallographic phase-transition from orthorhombic to cubic phase of three batches of ammonium per chlorate (AP) are in the range of 133.1 J g⁻¹-137.7 J g⁻¹, and the corresponding temperatures are in the range of 240.5 °C to 241.8 °C. The peak temperatures of decomposition for the low-temperature decomposition (LTD) are in the range of 293.7 °C to 297 °C; and high-temperature decomposition (HTD) are in the ranges of 370.3 °C to 376.1 °C. The total exothermic enthalpies are in the range of 1655.6 J g⁻¹ to 1668.4 J g⁻¹. The results are highly reproducible.

Graphical Abstract



TG – DSC Curves of AP Batch No. 2707.

Keywords: Ammonium Per chlorate, TG, DSC, Enthalpy, Phase-transition, Decomposition, Quality Control Tool.