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NH_4ClO_4 Decomposition with Nano–CuO, Cr_2O_3 and Mixed Catalysts

Rashmi Kumari[1] and M. R. R. Prasad[2]*

1. M. Tech. Research Scholar, Department of Nano Science and Technology, Central University of Jharkhand, Ranchi-835205 **INDIA**
2. Scientist / Engineer-SF (Retired), Vikram Sarabhai space Centre, Thiruvananthapuram-695022, Kerala, **INDIA**

Email: mandapaka.p@gmail.com, rashmi809@gmail.com

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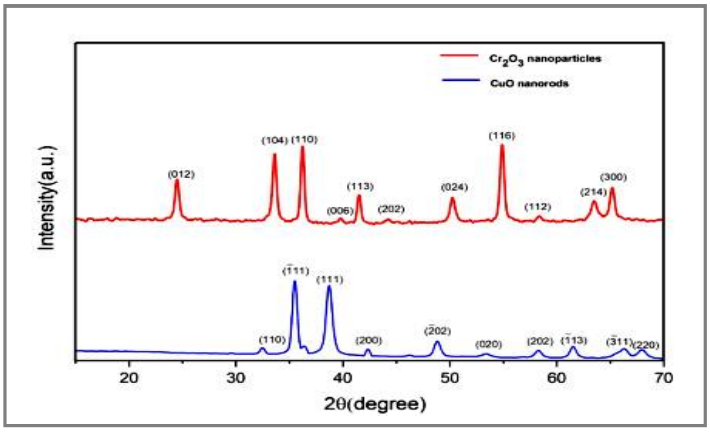
ABSTRACT

*Modification of thermal decomposition of ammonium per chlorate (AP) by Nano-Copper Oxide (CuO) and Nano-Chromium Trioxide (Cr_2O_3); and combinations of CuO and Cr_2O_3 are discussed. These studies were carried out employing XRD, FESEM, HRTEM, TG and DSC techniques. Presence of CuO or Cr_2O_3, or combinations of these oxides does not influence the endothermic crystallographic phase-transition temperature of AP from orthorhombic to cubic phase. Thermal stability of systems under consideration are in the order of: [*AP: CuO: Cr_2O_3:: 100: 0.99: 0.01*]> (AP–CuO) > [*AP: CuO: Cr_2O_3:: 100: 0.995: 0.005*] > [*AP: CuO: Cr_2O_3:: 100: 0.98: 0.02*]> (AP–Cr_2O_3) > AP. The catalyst system of [*AP:CuO:Cr_2O_3:: 100:0.99: 0.01*] gives maximum catalytic effect, and maximum enthalpy of 2131.9 J g^{-1}.*

Graphical Abstract



XRD spectrum of CuO-nanorods; and Nano-Cr_2O_3.

Keywords: Ammonium per chlorate, Chromium Tri-oxide, Copper Oxide, Enthalpy, Mixed metal oxides.