



NH₄ClO₄ Decomposition with Nano-CuO, Cr₂O₃ and Mixed Catalysts

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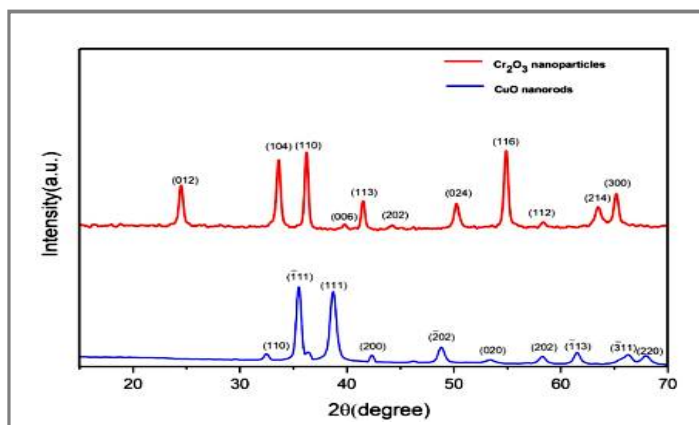
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ABSTRACT

Modification of thermal decomposition of ammonium per chlorate (AP) by Nano-Copper Oxide (CuO) and Nano-Chromium Trioxide (Cr₂O₃); and combinations of CuO and Cr₂O₃ are discussed. These studies were carried out employing XRD, FESEM, HRTEM, TG and DSC techniques. Presence of CuO or Cr₂O₃, 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: Cr₂O₃:: 100: 0.99: 0.01] > (AP-CuO) > [AP: CuO: Cr₂O₃:: 100: 0.995: 0.005] > [AP: CuO: Cr₂O₃:: 100: 0.98: 0.02] > (AP-Cr₂O₃) > AP. The catalyst system of [AP:CuO:Cr₂O₃:: 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-Cr₂O₃.

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