



NH₄ClO₄ Decomposition with Nitrates of La, Ce, Nd, Sm, Eu

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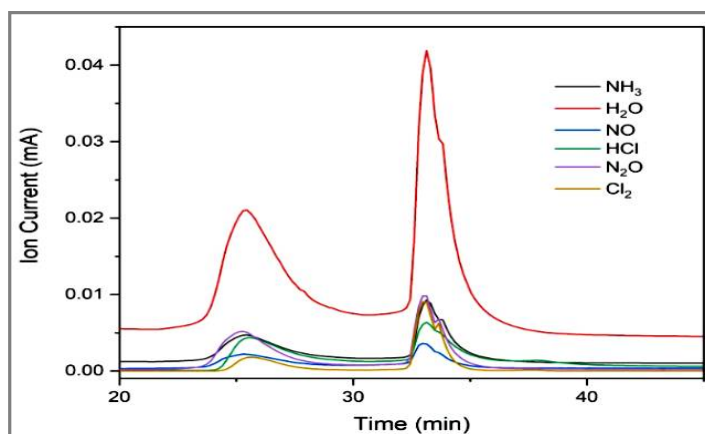
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ABSTRACT

Thermal decomposition of ammonium per chlorate in the presence of lanthanide (Ln) nitrates, where Ln = La, Ce, Nd, Sm, and Eu is studied. The analytical techniques of mass spectrometry (MS), thermo gravimetric (TG), and differential Scanning Calorimetry (DSC) have been employed. In all the cases of Ammonium Per chlorate (AP)-Lanthanide nitrate mixtures, the major product evolved is H₂O. Besides H₂O, HCl, and NH₃ are common products released. N₂O, Cl₂, and O₂ have not been observed in the case of pure AP. In the case of AP-Samarium nitrate system NO is not observed, and O₂ is the other major product evolved. The cessation of decomposition of AP after an initial conversion of 30 percent is modified in the presence of nitrates of La, Nd, Sm, and Eu in the range between 35 % and 50%. In terms of heat release, Samarium nitrate gives better energy output (1207 J g⁻¹).

Graphical Abstract



TG-MS peaks corresponding to pure AP-Neodymium Nitrate.

Keywords: Ammonium, per chlorate, lanthanide nitrates, MS, TGA, DSC.