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Thermal Decomposition of Tetrabutylammonium – tetrafluoroborate, hexafluorophosphate and perchlorate

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ABSTRACT

As a prelude to their use as additives for the modification of thermal decomposition of ammonium per chlorate (AP), a solid rocket propellant oxidizer; thermal decomposition of tetra-n-butyl ammonium hexafluorophosphate (TBAHFP), tetra-n-butyl ammonium tetrafluoroborate (TBATFB), and tetra-n-butyl ammonium per chlorate (TBAP) was studied at a sample heating of $10^{o}c.min{-}1$, in an inert gaseous atmosphere of pure nitrogen, in a DuPont – 990 and DuPont-2000 thermal analysis systems. Thermal stabilities of these compounds were found to be in the order of TBAP < TBAHFP <TBATFB. Formation of tributylamine is the primary decomposition product together with HF, other Lewis acid formed include - BF_3 or PF_5 depending upon the compound under consideration.

Keywords: Tetra-n-butyl, ammonium, hexafluorophosphate, tetrafluoroborate, per chlorate, Lewis acid, thermal decomposition.
