

DETECTION OF PEROXIDE HIGH EXPLOSIVES BY SELECTED ION FLOW TUBE MASS SPECTROMETRY (SIFT-MS)

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In recent years exponents of asymmetric warfare have utilised high explosives based around peroxy bonds, with tragic results that have impacted on many lives worldwide. Unfortunately these peroxide explosive compounds are relatively easy to manufacture with mundane and commonly available precursors, while their detection presents significant difficulties due to the unstable nature of the substrate.

Two of the most commonly used peroxide explosives are 3,3,6,6,9,9-Hexamethyl-1,4,7-cyclonatriperoxane (also known as triacetone triperoxide, TATP, or “mother of Satan”), and 1,6-Diaza-3,4,8,9,12,13-hexabicyclo[4.4.4] tetradecane (also known as hexamethylene triperoxide diamine or HMTD). Common methods for detection or identification of these compounds require sample preparation or time-consuming chromatographic methods, which are not compatible with many commercial applications such as security screening. As a possible alternative, Selected Ion Flow Tube Mass Spectrometry (SIFT-MS), which does not require chromatographic columns, has been used to detect both compounds in real time from the headspace above substrate.