B111 Analysis of Explosives for Homeland Security by Chemical Ionization GC/MS

Eric Phillips, BS, Thermo Electron, 2215 Grand Avenue Parkway, Austin, TX 78728*

After attending this presentation, attendees will understand the technique for analyzing low levels of explosives and residues.

Explosive compounds are by their very nature unstable. Analysis of these compounds, precursors, and residues by GC/MS requires the samples be forced into the gas phase without decomposition. This can be accomplished by using a PTV injector. The sample is injected at a temperature that is high enough to volatilize the solvent but not the compounds of interest. The injector temperature is then quickly ramped to volatilize the compounds of interest. This injection technique also allows larger sample volumes. This larger sample volume combined with negative chemical ionization will allow extremely low detection limits. The Trace DSQ eliminates neutral noise and there is virtually no chemical noise when using negative chemical ionization. There are very few types of compounds that will form a stable negative ion. Due to the fast scanning rates of this instrument, fast GC techniques will be used.

EPA method 8095 includes compounds that are explosives, explosive residues, and compounds that are used in the creation of explosives. Following EPA method 8095 protocols, which is normally performed on an ECD, the Trace DSQ with large volume injections and negative chemical ionization is able to show a linear calibration curve from 1 to 1000 pg/ul. This will show correlation coefficients of 0.99. Scanning at 3000 amu/s will allow the GC run time to be less than 12 minutes and enough points across the peak for it to be fully characterized.

Homeland Security, GC/MS, Explosives

 ** Presenting Author*