

Trace Analysis Testing and Verification of Low Volatility Materials

Research projects focus on development of novel analytical methods for accurate generation and verification of trace vapor streams and/or headspace analysis of low-volatility target analytes of interest, such as explosives, narcotics, and other hazardous materials. Projects will utilize gas chromatography/mass spectrometry and may include other analytical instrumentation such as ion chromatography, liquid chromatography, and ion mobility spectroscopy, as well as canine detectors.

Examples of previous related research at NRL include:

- Giordano BC, Field CR, et al.; Trace explosives vapor generation and quantitation at parts per quadrillion concentrations. *Analytical Chemistry* 88, 3747-3753 (2016).
- Collins GE, Giordano BC, et al.; Trace explosives sensor testbed (TESTbed). *Review of Scientific Instruments* 88, 034104 (2017).
- DeGreeff LE, Cerreta MM, Katilie CJ; Variation in the headspace of bulk hexamethylene triperoxide diamine (HMTD) with time, environment, and formulation. *Forensic Chemistry* 4, 41-50 (2017).
- DeGreeff LE, et al.; Passive delivery of mixed explosives vapor from separated components. *Forensic Chemistry* 4, 19-31 (2017).
- Katilie CJ, Simon AG, DeGreeff LE; Quantitative analysis of vaporous ammonia by online derivatization with gas chromatography - mass spectrometry with applications to ammonium nitrate-based explosives. *Talanta* 193, 87-92 (2019)."