

Chromatography

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The Expertise group Energetic Materials is equipped with a range of chromatographic analysis techniques which can be used for a wide range of applications.

Gas Chromatography (GC)

Using Gas Chromatography, a gas mixture can be separated and the individual components can be identified and quantified on a ppm and percent level.

The gas chromatograph is equipped with a Thermal Conductivity Detector (TCD), a Flame Ionization Detector (FID), and an Electron-Capture Detector (ECD).

The ECD has a very high sensitivity for halogens, phosphorus, and nitro-groups, allowing detection of explosives with nitro-groups at very low concentrations in both liquid and gas phase.

Due to the special sampling configuration, this GC can be used for analyzing gas holders like gas cylinders and for determining the concentrations of dissolved N₂, O₂, Ar, CH₄, CO, and CO₂ in aqueous samples.

After changing the columns, the GC may also be used for other applications.



Gas Chromatography-Mass Spectrometry (GC-MS)



In a GC-MS, components are analyzed using a mass spectrometer (MS) after separation using a GC, facilitating easier identification of the components.

Both liquid, solid, and gas phase samples can be analyzed using traditional injection and SPME fibers. The thermal desorption inlet enables analyzing Tenax thermal desorption tubes and Gerstel Twisters, facilitating trace level vapor detection.

Ion Chromatography (IC)

Using Ion Chromatography, ions dissolved in aqueous or organic solutions can be analyzed. In the current configuration, the IC can be used for analysis of the anions F⁻, Cl⁻, Br⁻, NO₂⁻, NO₃⁻, PO₄³⁻ en SO₄²⁻ with detection limits of 0.04 to 0.52 mg/L, depending on the anion. After changing the IC column, also methods can be developed for analyzing other anions and cations.



Ultra high performance liquid chromatography (UPLC)

The UPLC is mainly used for determining the stabilizer content in gun powders, for detection of energetic materials, and for determining the purity of synthesized compounds. Detectors present are a Photo Diode Array (PDA) and a Mass Spectrometer (MS).



If you see a potential application in one of your project for the use of these techniques please feel free to contact Reinier de Vries (contacts below).

TNO location The Hague Ypenburg

Ypenburgse Boslaan 2
NL-2496 ZA The Hague Postal address
P.O. Box 480 NL-2501 CL

+31 88 866 80 00

info@tno.nl

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