

Chromatography Corner

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upcoming events

Don't miss the last
Basic GC Class of 2010!

- Oct. 13-14: Basic GC Class
Where: Martinez, CA
Cost: \$1,000 per person

To register for one of
Wasson-ECE's webinars
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Concentration and Analysis of Bromomethane, cis-1,3-Dichloropropene, and trans-1,3-Dichloropropene in Ambient Air Samples

Bromomethane, cis-1,3-dichloropropene, and trans-1,3-dichloropropene are used extensively in farming as pesticides, specifically as pre-plant fumigants and nematicides. However, these chemicals have been classified as ozone depleting and must be monitored in the air due to strict government regulations.

For the analysis and concentration of bromomethane, cis-1,3-dichloropropene, and trans-1,3-dichloropropene Wasson-ECE configured an Agilent Technologies GC with an MSD and auto-sampling cryogenic air concentrator.

The Wasson-ECE Instrumentation auto-sampling cryogenic air concentrator was designed to concentrate bromomethane, and

cis and trans-1,3-dichloropropene, as well as other non-polar compounds from 16 different sample inputs. This system is designed to work in conjunction with Agilent MSD ChemStation, therefore the two systems did not need to be synchronized.

The concentrator unit could be run manually or automatically using ChemStation, and concentrated volume ranges between 15 and 600mL. Before the sample is introduced, the user has the option to pressurize the sample canister and/or complete a dilution calculation for the multiplier used by the ChemStation data analysis. If the pressurize option is on, then the initial and final pressures are recorded in the data file to be used in the multiplier calculation. Once the analytes are concentrated, they are desorbed to a GC/MS performing high resolution GC. Reporting limits for this method were less than 1 part-per-trillion (ppt).

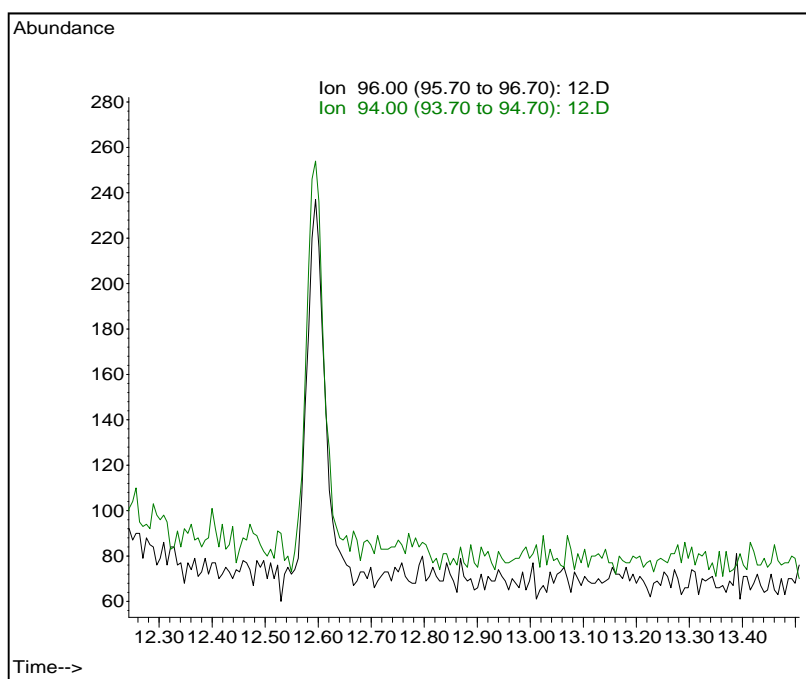


Figure 1: Two runs showing the analysis of bromomethane at 7 ppt by GC/MS.



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Custom Reformer Gas Analysis

Due to the standards that must be met for reformer gas processing, hydrocarbons, water, CO/CO₂, and other gases must be quantified to make sure the final product falls within pipeline specifications.

For the analysis of reformer gas off of a reactor, Wasson-ECE configured an Agilent Technologies 7890 gas chromatograph (GC) with flame ionization and dual thermal conductivity detectors (FID/TCD/TCD).

Components analyzed on the FID include C₁ through C₁₂ hydrocarbons separated by boiling point. Components identified during method development included: methane, ethane, ethylene, propane, propylene, acetylene, isobutane, propadiene, n-butane, t-2-butene, 1-butene, isobutylene, c-2-butene, neopentane, isopentane, methyl acetylene, n-pentane, 1,3-butadiene, neohexane, n-hexane, heptane, benzene, toluene, o-xylene, p/m-xylene, 1-methyl naphthalene, and dimethyl naphthalene with a final C₁₂⁺ backflush to the detector.

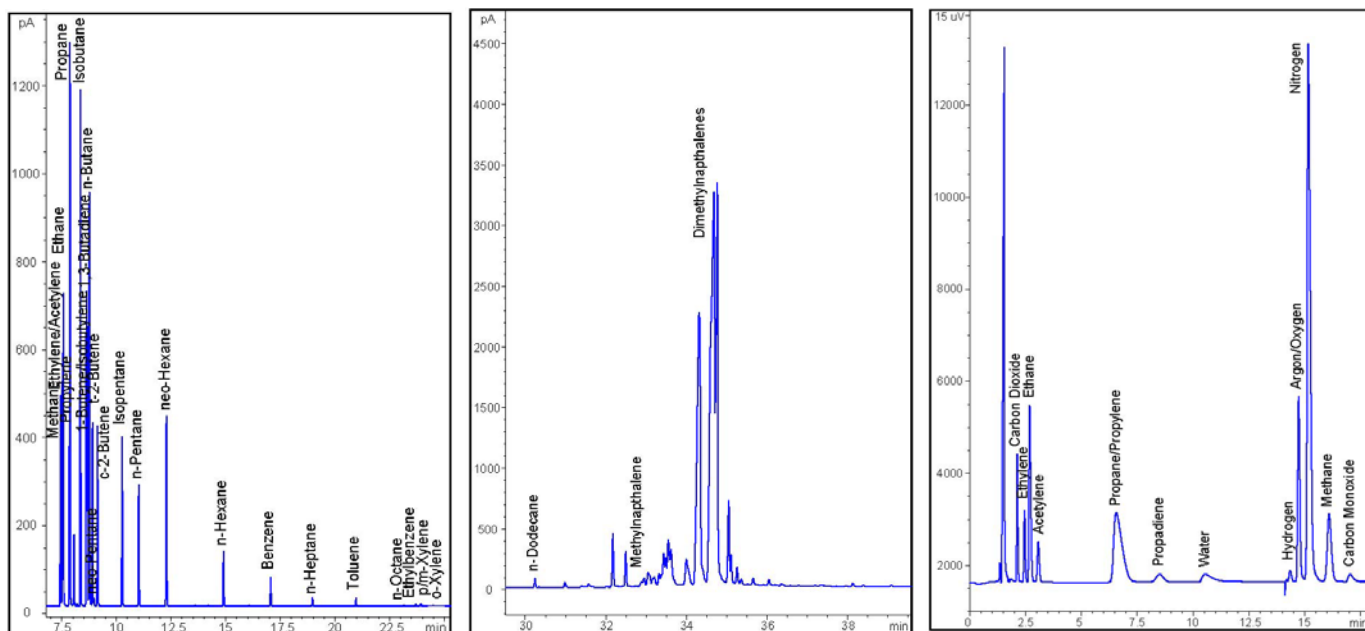
The lower detection limit for the FID is 0.01% per component.

Components analyzed on the TCDs included:

Component	Min. conc.	Max. conc.
Hydrogen	100 ppm	10 %
Carbon dioxide	100 ppm	10 %
Water	1%	60 %
Oxygen/argon composite	100 ppm	10 %
Nitrogen	100 ppm	10%
Methane	100 ppm	50 %
Carbon monoxide	200 ppm	10 %

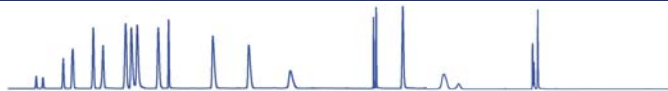
Although dual TCDs and a FID are employed, the TCD signals are electronically summed to provide a single TCD output.

By employing three detectors on one GC system, the analysis was able to be completed in less than 40 minutes.



Figures 2, 3, and 4: Figures 2 and 3 show the C₁ through C₁₂ hydrocarbon analysis on the FID and figure 4 shows the summed signals of the dual TCD analysis.

Chromatography Tips and Tricks



Contaminants entering a carrier gas stream can adversely affect the performance of the GC system. To prevent damage and interference caused by water, oxygen and hydrocarbon contaminants, Wasson-ECE recommends purification of gases entering the GC system.

The carrier gas is one of the most critical gases entering the GC system. Even very pure gas cylinders can contain about 10 ppm of oxygen, water and hydrocarbons. Although these concentration levels are normal, they can be detrimental to a GC system, especially those using ultra sensitive detectors such as the pulse discharge helium ionization detector (PDHID). A typical sign of carrier gas contamination is an erratic baseline, including baseline wandering, drifting, or excessive noise.

To prevent irreversible damage and interferences caused by oxygen, water, and hydrocarbons Wasson-ECE recommends using the following traps for your supply gases:

- FID/TCD: Molecular Sieve Drying Tube, this easily handles excessive water contamination and other general hydrocarbon impurities
- O-FID: OMI™ Indicating Purifier to remove all critical impurities at ambient temperatures
- PDHID: Helium Purifying Getter, this is to be used in addition to ultra high purity gas
- SCD: Sulfur trap, although this is not always necessary, it is highly recommended for very low level sulfur analyses

Additional questions? Contact our service department at (970)221-9179 or service@wasson-ece.com.



Wasson-ECE Instrumentation News

New for 2010 Wasson-ECE Training on the Road!

Wasson-ECE will be taking our 2-day Basic GC Course on the road. See below for the final class of 2010.

October 13-14: Martinez, CA

Cost: \$1000 per participant

Sign-up at www.wasson-ece.com and click on the Education Center or call (970) 221-9179.



Events Calendar



Wasson-ECE Instrumentation

specializes in configuring and modifying new or existing Agilent Technologies gas chromatographs. Our systems are guaranteed, turn-key analytical solutions, with the installation, warranty and service plan on us. Contact us for your custom GC analysis needs and find out what a difference over 20 years of experience can make.

October 13-14: Basic GC 2-Day Course in Martinez, CA

October 20: Free Webinar Covering a New Wasson-ECE GC Application TBD

November 17: Free Webinar on New Wasson-ECE Hardware TBD

Want a custom training course for your company? Need training at your site? Contact Wasson-ECE for your quote today at training@wasson-ece.com or call (970)221-9179.



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