

CryoTrap

For Agilent Technologies 8890/7890 GC Systems

jas CryoTrap



SIMPLY SMART SOLUTIONS



Features

Bad peak shapes and interferences of low boiling compounds are often observed in case of using a sample introduction other than liquid injection, such as headspace, thermal desorption or sampling loop for gas analysis.

In order to improve peak shape and peak resolution in the chromatogram it is required to refocus high volatile components in the front of the column before chromatographic separation. Otherwise incorrect peak identification and peak integration may occur.

The JAS double chamber CryoTrap is a powerful tool of high quality to efficiently trap volatile compounds in the front part of a capillary column. It combines the latest advances in CryoTrap technology including low thermal mass, efficient insulation and maximum heating power - features that ensure a fast heating and an economical cooling. Various appropriate coolants can be used to cool the trap (liquid carbon dioxide, liquid nitrogen and pressurized air). An extremely fast but controlled heating of the trapping zone up to 700°C/ min allows a rapid re-vaporization of the trapped components for subsequently GC analysis - replacing a high speed injection. As a result low boiling compounds occur as sharp peaks with a high resolution in the chromatogram. JAS CryoTrap can be actuated either due to control software embedded into Agilent ChemStation or by GC keyboard.

JAS CryoTrap is provided to be fully integrated in Agilent 8890 and 7890 GCs. It can be positioned inside the GC oven, either at the left hand side wall of the GC oven or below the valve cabinet. The device requires one heated zone (150W) and one pneumatic inlet slot of the GC. In case of Multi Dimensional GC applications, JAS CryoTrap can also be mounted outside the GC oven and connected to a second GC by means of an optional heated transfer line.

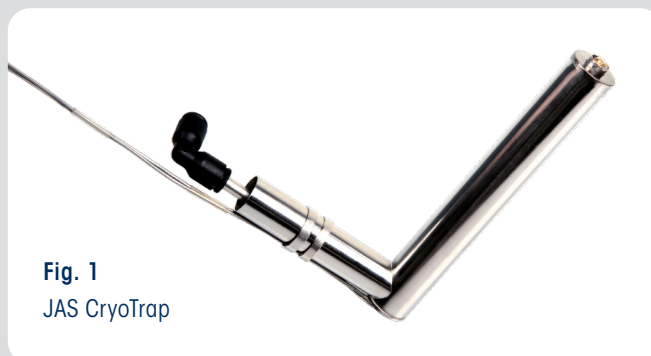


Fig. 1
JAS CryoTrap

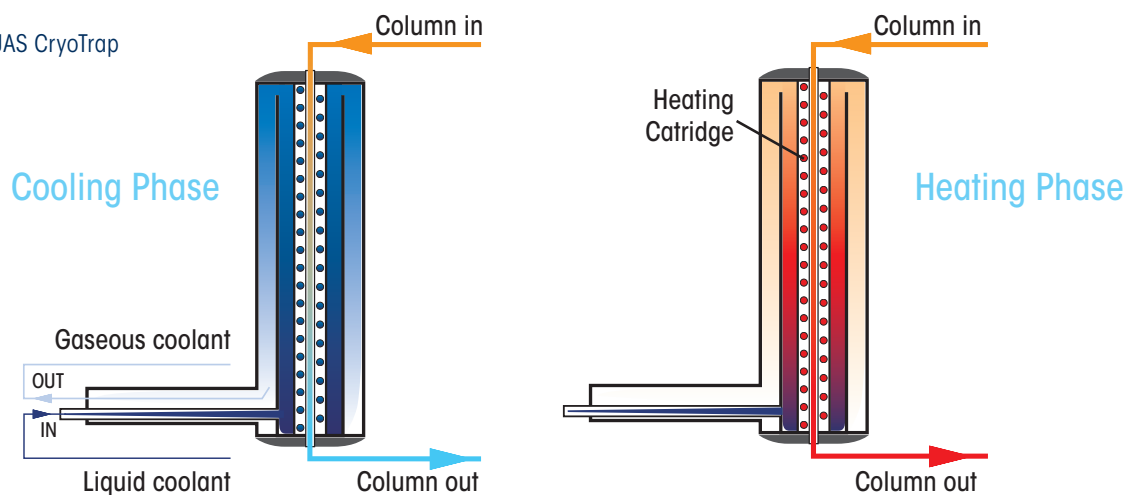
Features

The main advantageous features of JAS CryoTrap system are:

Flexible	In order to meet your analytical needs JAS CryoTrap can be installed at various positions (two locations inside the GC oven and one location outside). Additionally, three different cooling options (liquid CO ₂ , liquid N ₂ and pressurized air) provide complete flexibility to guarantee the most effective analytical conditions.
Efficient	By means of a double chamber design the JAS CryoTrap features an effective insulation reducing the coolant consumption to a minimum.
Easy to Use	Dedicated and optimized alignment of tuning parameters provides excellent performance at any oven temperature
Economical	JAS CryoTrap is controlled either by Agilent ChemStation software or by GC keyboard. The use of the Trap is easy and may be embedded into every GC method.

Operating Mode

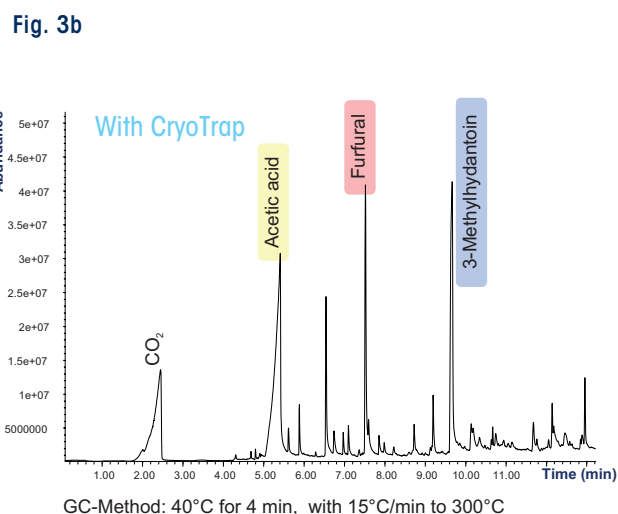
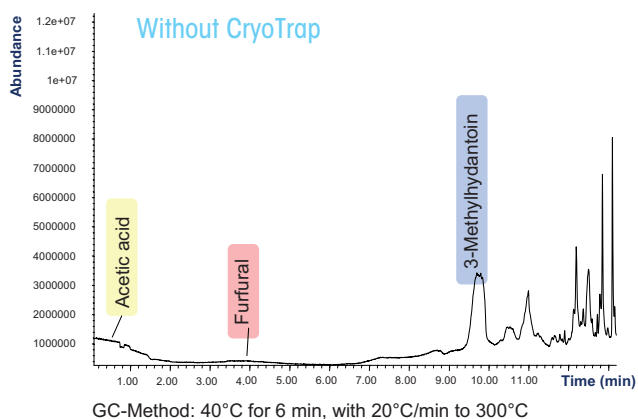
Fig. 2
Functionality of JAS CryoTrap



The outer wall of the JAS CryoTrap is made of stainless steel. In order to resist thermal fluctuation a tube of a specific material for optimal heat carriage is inserted into the CryoTrap body.

The analytical column is guided through the CryoTrap chamber. Due to appropriate coolants the trap is cooled down to the effective temperature and components transferred from the inlet system to the analytical column are trapped before chromatographic separation. Re-vaporization for subsequent GC analysis is caused by means of rapid but controlled heating of the trapping zone. Temperature and time of trapping process can be optimized depending on the analytes and may easily be adjusted using the control software. A fast heating rate is important in order to obtain sharp peaks of volatile components. As a result peak broadening and interferences are minimized and quantitative evaluation becomes more precise.

Fig. 3a
Analyses of high volatile compounds in wood samples



Chromatograms of a wood sample are illustrated for comparison. Figure 3a shows the bad quality of peak resolution for high volatile components, like acidic acid or furfural, in case no Cryo Trap is used. An identification and integration of these peaks with reasonable certainty is not possible. Figure 3b demonstrates the necessity of using a CryoTrap in order to improve the peak resolution of low boiling compounds.

Operating Mode

4a

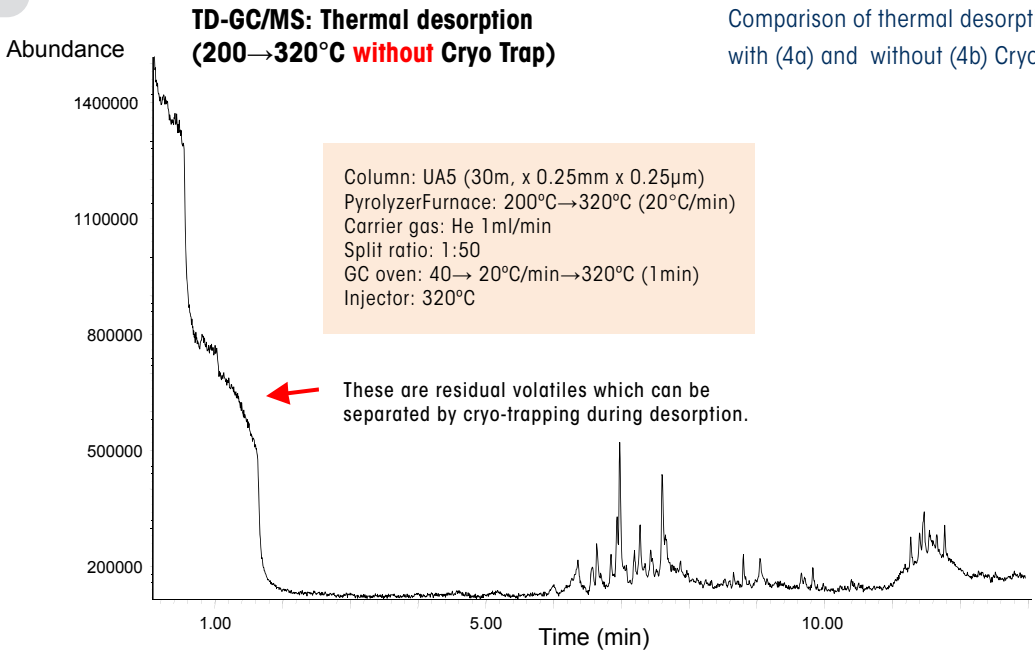
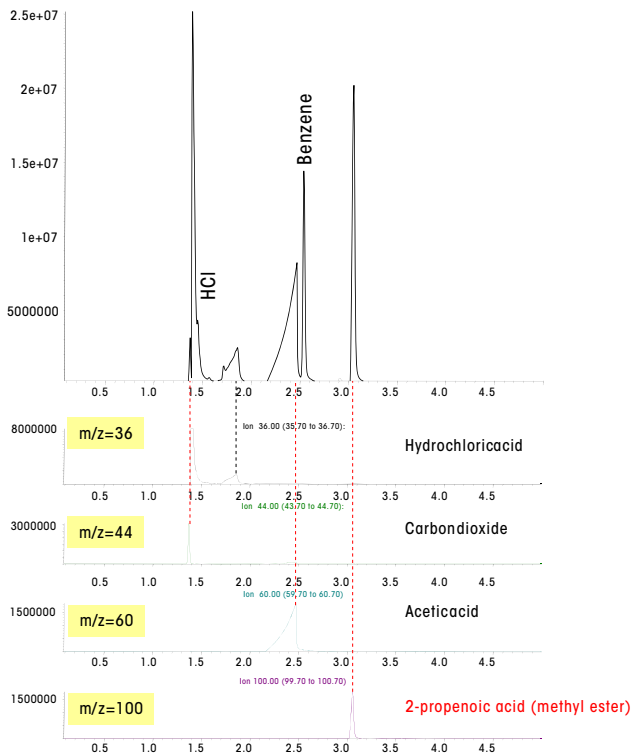


Figure 4:

Comparison of thermal desorption analysis (200– 320°C) with (4a) and without (4b) Cryo Trap (TD-GC/MS system)

4b

TD-GC/MS: Thermal desorption (200→320°C with CryoTrap)



Thermal desorption often results in broad initial peaks including numerous individual components. While reducing of the initial column temperature or using thick film columns will just narrow this initial band width, cryo-focussing is the most efficient and cost effective way of ensuring peak separation.

Figure 4a and b illustrate the separation improvement of the volatile fraction by means of cryo-trapping. Qualitative and quantitative data quality will be enhanced tremendously.

Specifications

Specifications of JAS CryoTrap

Description	Double chamber CryoTrap design with combined inlet/exhaust port
Instrument Dimensions	Length: 105 mm Width: 20 mm (o.d.) / 1 mm (i.d.)
Power	Int. Power Supply 24V, Input 150 VA
Maximum Temperature	Agilent GC 8890: 450°C Agilent GC 7890: 450°C
Cooling Temperature	Liquid N ₂ : -160°C Liquid CO ₂ : -60°C Pressurized Air: ambient temperature or oven start temperature
Heating Rate	1-700°C/min

In case of Multi Dimensional GC application the JAS CryoTrap is positioned outside the oven to trap components eluting from the first separation column.

Using liquid nitrogen as cooling agent a dewar vessel with a dip tube is required (minimum 1 bar head pressure for full performance mandatory). In case of liquid carbon dioxide as cooling agent a cylinder with a dip tube and a variable restriction is required.



About Joint Analytical Systems

Since 1995 JAS has been a Premier Solution Partner and Value Added Reseller of Agilent Technologies. We are an innovative-driven organization that offers customized solutions for GC, GCxGC, μ GC, GC-AED, GC-MS, GC-QQQ, LC, LC-MS, LC-QQQ and Q-TOF LC-MS applications.

JAS serves key industries such as

- Chemical
- Petrochemical/HPI
- Environmental
- Food & Flavor
- Forensic

JAS Products for GC

- Atomic Emission Detector
- UNIS Inlet Systems
- Automatic Gas Samplers
- CryoTrap
- Customized Valving Systems
- EzPrep - Preparative Fraction Collector
- Olfactometer
- GICU - Gas Injection Control Unit

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