

Application News

No. G322

Gas Chromatography

Packed Column Analysis of Organic Solvent Mixture Using Nexis™ GC-2030 (FID)

The Nexis GC-2030 gas chromatograph has begun to support packed columns. The detectors compatible with packed columns are a flame ionization detector (FID) and a thermal conductivity detector (TCD).

In this article, we provide an example of SUS-packed column FID analysis using the Nexis GC-2030, showing the separation of an organic solvent mixture.

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■ Packed Column Support System

An SUS column which can be used with the Nexis GC-2030, a system compatible with packed columns, is the same as that used for the GC-14, GC-17 or GC-2014, and it can be shared between these instruments.

Using the FID-2030Packed kit (P/N: S221-85191-41), the FID-2030 can be easily modified to become a packed FID by:

- Replacing the standard nozzle for the FID with one for a packed FID;
- Removing the FID's capillary column adaptor.

Fig. 1 shows an example of SUS column installation.

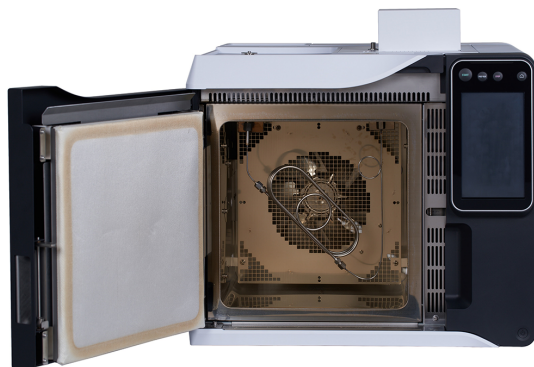


Fig. 1 Example of SUS Column Installation

■ Extendable to Dual Line

A packed column analysis of samples with a column temperature elevating program may cause greater baseline drift due to the elution of the liquid phase from the column, which can affect the identification or quantitative processing.

The FID-2030 (compatible with packed columns) can be extended to a dual line system consisting of the reference line, which has a sample vaporization chamber, column and detector, for elimination of baseline drift, as well as the sample line for analyzing samples.

■ Organic Solvent Mixture

The sample prepared by mixing equivalent quantities of 12 organic solvents shown in Table 2 was analyzed using an SUS packed column. The obtained chromatogram was equivalent to that obtained from the results of analysis using the GC-2014.

■ Analysis Conditions

Table 1 lists the configuration of the instrument used for analysis and the analysis conditions.

Table 1 Instrument Configuration and Analysis Conditions

Model	: Nexis GC-2030 /AOC-20i +SINJ-2030+FID-2030Packed Kit
Injection Mode	: Direct
Injection Volume	: 0.2 µL
Injection Temp.	: 250 °C
Carrier Gas	: He
Carrier Gas Control	: Constant flow rate (20 mL/min)
Column	: Porapak™ Q 80/100 (2 m × 3 mm I.D.)
Detector	: Flame ionization detector (FID)
Detector Temp.	: 280 °C
Detector Gas	: H ₂ 32.0 mL/min, Air 200 mL/min (No makeup gas required)
Column Oven Temp.	: For the isothermal conditions and column temperature program conditions, see "Results of Isothermal Analysis" and "Results of Column Temperature Program Analysis."

■ Compounds to be analyzed

The sample was prepared by mixing equivalent quantities of the compounds shown in Table 2.

Table 2 Compounds Contained in Sample

No.	Name
1	Methanol
2	Ethanol
3	Acetonitrile
4	Acetone
5	1-Propanol
6	Methyl ethyl ketone
7	Ethyl acetate
8	2-Methoxyethanol
9	Benzene
10	2-Ethoxyethanol
11	N,N-dimethylformamide
12	Tetrachloroethylene

■ Results of Isothermal Analysis

The chromatogram of isothermal analysis at a column temperature of 75 °C is shown in Fig. 2.

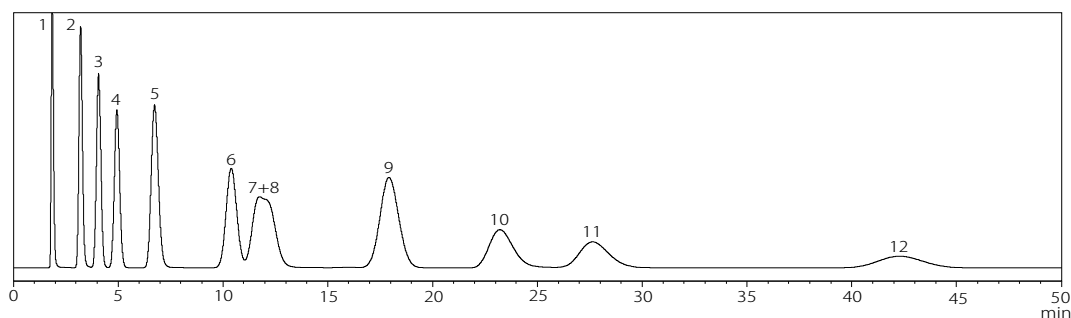


Fig. 2 Chromatogram of Isothermal Analysis

■ Results of Column Temperature Program Analysis

The chromatogram of the column temperature program analysis is shown in Fig. 3.
40 °C (0 min) - 10 °C /min - 250 °C (0 min) - -10 °C /min - 200 °C (0 min)

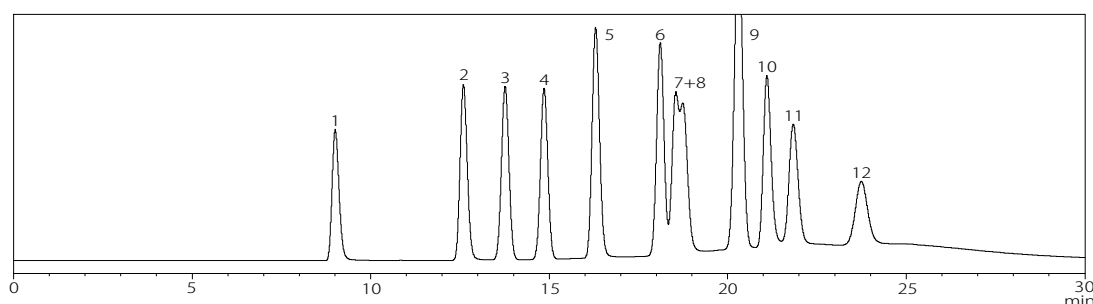


Fig. 3 Chromatogram of Column Temperature Program Analysis

■ Conclusion

With an SUS packed column connected to the FID modified for packed columns installed into the Nexis GC-2030, the organic solvent mixture was analyzed using a single column. As with packed column analysis using the GC-2014, favorable separation was confirmed. The detector gas control of the GC-2030 is a key-operable digital control, making it easier to operate than the GC-2014.

Optional Information on Nexis GC-2030

The Nexis GC-2030 system makes a wide variety of useful options available.

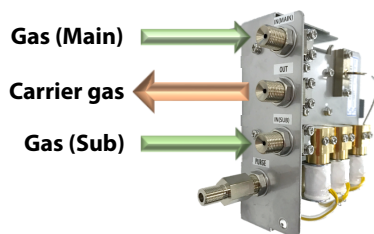
<Gas selector>

The gas selector is a unit which can switch between two types of carrier gas supplied to a gas chromatograph.

For example, when performing analysis using helium gas, it allows you to reduce helium consumption significantly by switching to an alternative gas while waiting for analysis.

The gas selector can be controlled using LabSolutions™, and the settings of the gas to be supplied are recorded in the data obtained, which helps ensure data integrity.

Additionally, the gas selector has an automatic gas switching function in the event of an error, switching the gas supplied as the carrier gas to another gas automatically when there is a reduction in the supply pressure.



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