

Analysis of TO-14 Gas Using a Wide-bore Capillary Column

The GCMS-QP2010 makes use of a differential evacuation system for vacuum pumping (Fig.1). The differential evacuation system uses two vacuum pumps for evacuation. The eluted sample from the column is ionized in the ion source and then separated in the quadrupole section according to the mass-charge ratio of components. To achieve effective separation for high-sensitivity detection, the vacuum in the quadrupole section must be

maintained as high as possible for effective ion transmission. On the other hand, in the ion source section, there is a limit to the achievable degree of vacuum due to the constant influx of carrier gas from the column. Therefore, two pumps are used to separately evacuate the ion source and the quadrupole section. As a result, the quadrupole section can be maintained at a high degree of vacuum free from the affect of carrier gas. The differential evacuation system also helps improve sensitivity by minimizing background noise, as well as allows the increase of the carrier gas flow rate.

This data sheet presents an example of TO-14 gas analysis using a wide-bore capillary column directly connected to the MS unit, which demonstrates the advantage of GCMS-QP2010's capability for high-flow rate carrier gas. Fig.2 shows the total ion chromatogram. Conventional GC/MS instruments have a maximum flow rate of about 5mL/min, and higher flow rates result in damage of the instrument or loss of sensitivity. In this measurement, all components were successfully detected at a flow rate as high as 10mL/min.

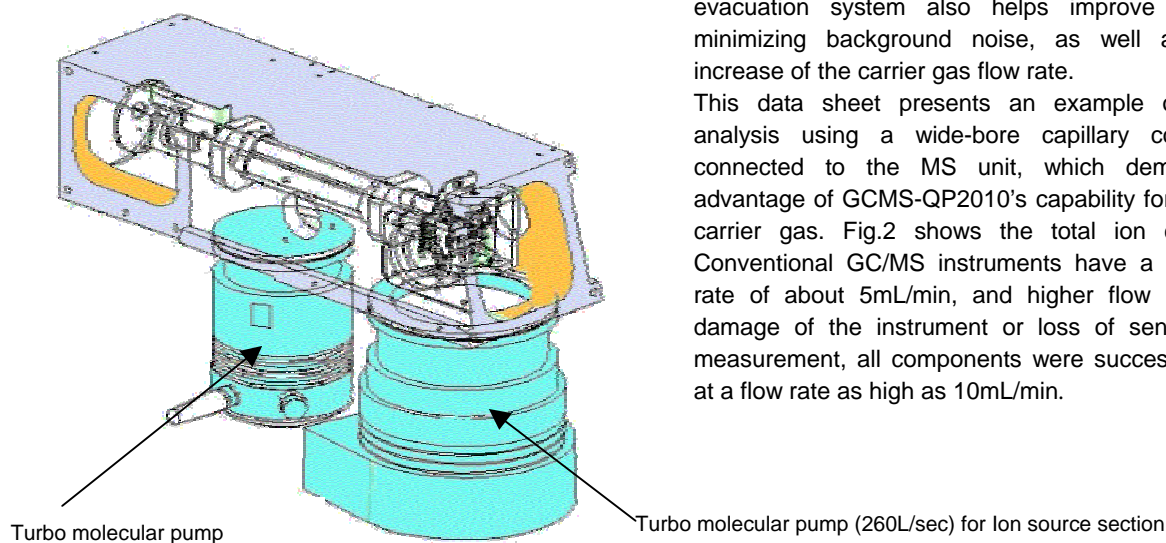


Fig.1 Differential Evacuation

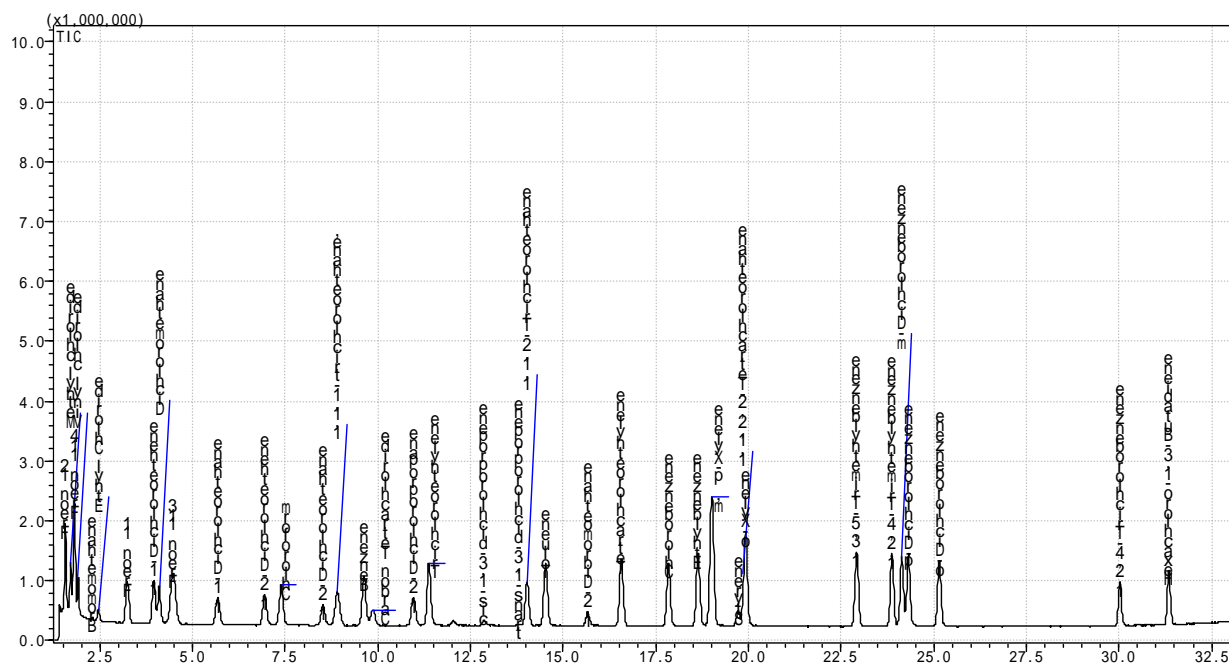


Fig. 2 Total Ion Chromatogram of 1ppm TO-14

Table 1 Analytical conditions for GC-MS

Equipment	: GCMS-QP2010
Column	: HR-1 (60m x 0.53mm i.d. df=3.00 μ m)
Column Time program	: 30°C(5min)-5°C /min-150°C -10°C /min -250°C (3min)
Carrier Gas	: Constant Linear Velocity 80.2cm/sec (He 47.7kPa)
Injection Temp.	: 200°C
Injection Method:	Split
Injection Volume	: 0.8ml
Interface Temp.	: 200°C
Ionsource Temp.	: 200°C
Scan	: m/z 45-250 (interval 0.5sec)

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