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Application Data Sheet

No.11

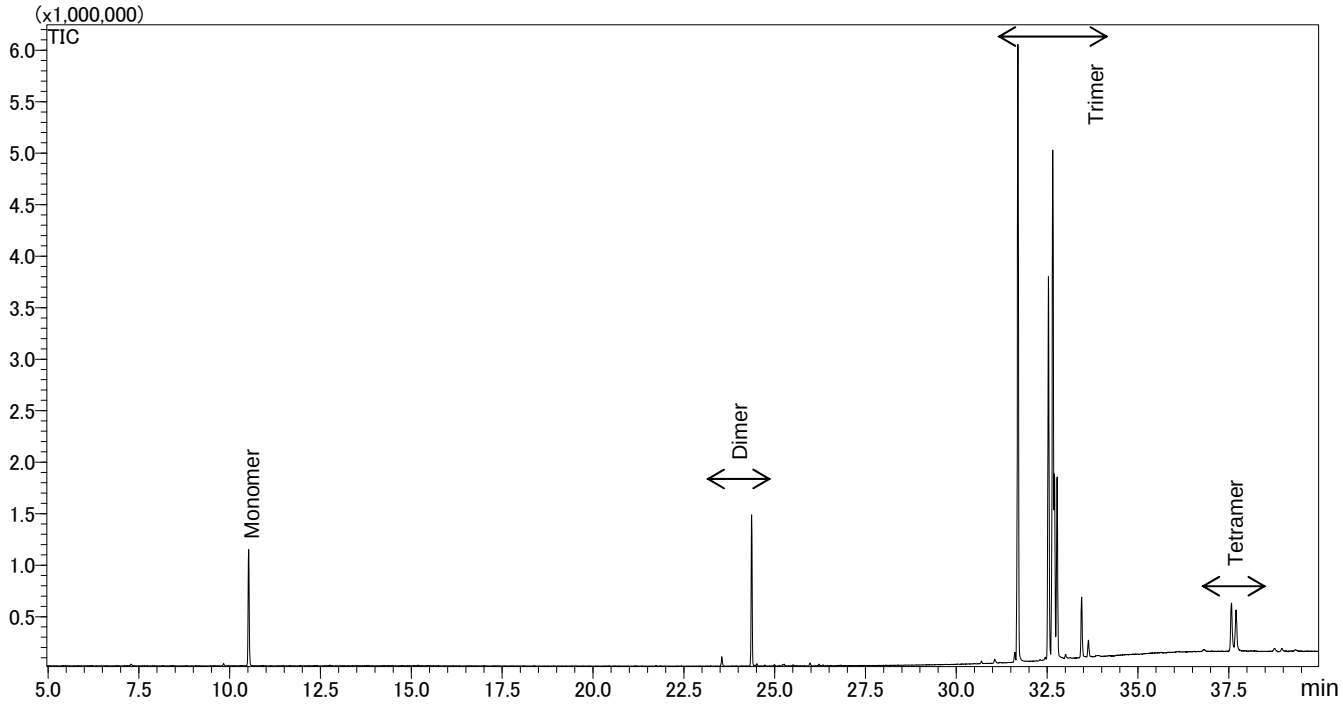
GCMS

Gas Chromatograph Mass Spectrometer

Analysis of a Gas Emitted from Polystyrene Using the Thermal Desorption Method

Generally, in analyzing gases emitted from a sample, the sample is first loaded into a chamber and Tedlar bag, where it is sealed and then heated. Afterwards, the gas emitted is concentrated in a collection tube, and then analyzed using the thermal desorption method. With the TD-20 thermal desorption system, the sample is loaded directly into a glass tube exclusively designed for the TD-20 (P/N: 223-57119), and the gas emitted when the sample is heated can be analyzed without utilizing a chamber. This not only reduces the amount of work required when sampling, but also reduces the loss of high boiling-point substances because the flow line has been significantly shortened.
In this experiment, 0.5 mg of polystyrene was loaded into a glass tube for the TD-20. Both ends of the tube were fastened with 5 mg of quartz wool. The gas emitted when the sample was heated at 250oC for 30 minutes was then analyzed, and the total ion current chromatogram (TIC) obtained is shown below. It can be confirmed that, in addition to the polystyrene monomer styrene, dimer, trimers, and tretramers were produced when the sample was heated at 250 ℃.

TD	: TD-20				
GC-MS	: GCMS-QP2010 Ultra				
Column	: Rtx-1 (60 mL × 0.32 mmI.D., 0.25 µm)				
[TD]		[GC]		[MS]	
Sample heating temperature	: 250 ℃	Column oven	: 40 ℃ (5 min) -> (10℃/ min) -> 320℃ (15 min)	Interface	: 250 ℃
Flow rate	: 50 mL/min (30 min)	Injection mode	: Split (1:50)	Ion source	: 200 ℃
Secondary trap tube	: Tenax TA	Carrier gas	: Helium	Measurement mode	: Scan
Trap tube cooling	: -15 ℃	Control mode	: Pressure (80 kPa)	Mass range	: *m/z* 35-450
Trap tube heating	: 280 ℃ (5 min)			Event time	: 0.3 sec
Line	: 230 ℃			Emission current	: 60 µA (normal)
Valve	: 230 ℃				
Interface	: 230 ℃				



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