

# Application Data Sheet

## No.9

### GCMS

Gas Chromatograph Mass Spectrometer

## Analysis of an Electrolytic Solution from a Lithium Ion Rechargeable Battery

Electrolytic solutions in lithium ion rechargeable batteries consist of organic solvents (most of the carbonate series), electrolytes, and additives.

A GC-MS is useful for the evaluation of electrolytic solutions and for analyzing degradation due to repeated charging and discharging. This datasheet introduces a sample analysis of an electrolytic solution from a lithium ion rechargeable battery using a GC-MS.

### Experiment

In this analysis, an electrolytic solution was injected directly into the GC-MS for analysis.

Table 1: Analysis Conditions

GC-MS	: GCMS-QP2010 Ultra	[MS]	
Column	: Rtx-200MS (30 mL × 0.25 mmI.D., 1 μm) (RESTEK)	Interface temperature	: 250 °C
[GC]		Ion source temperature	: 200 °C
Vaporization chamber temperature	: 250 °C	Measurement mode	: Scan
Column oven temperature	: 40 °C (3 min) → (8 °C/min) → 280 °C (5 min)	Mass range	: <i>m/z</i> 35 - 500
Injection mode	: Split	Event time	: 0.3 sec
Split ratio	: 100		
Carrier gas	: Helium		
Control mode	: Linear velocity (40 cm/sec)		
Sample injection quantity	: 1 μL		

### Results

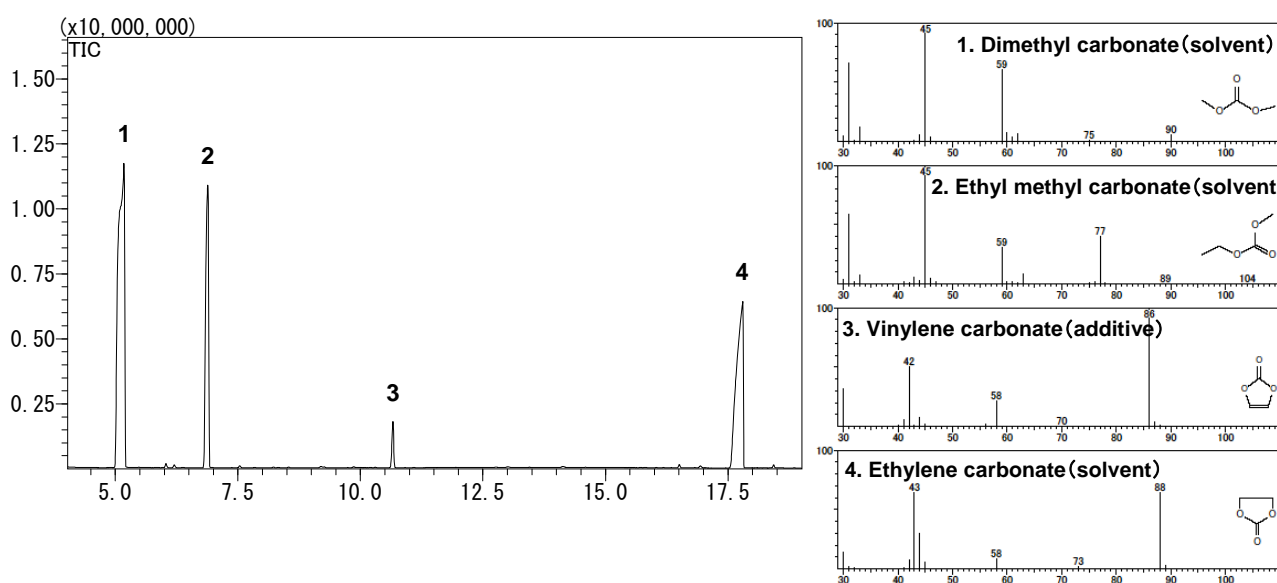


Fig. 1: Total Ion Current Chromatogram and Mass Spectra