

GCMS

Gas Chromatograph Mass Spectrometer

Analysis of Gas Generated from Lithium Ion Rechargeable Battery Cells

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

GC-MS systems are effective for the analysis of the denatured components of electrolytic solutions resulting from the charging and discharging of batteries. This article introduces a sample analysis of gas produced from a lithium ion rechargeable battery cell stored for 5 days at 80°C.

Experiment

Sample Extraction

A laminated aluminum battery was stored for 5 days at 80°C. The battery was then punctured directly by the tip of a gas tight syringe needle, and the gas compounds inside were collected.

Table 1: Analysis Conditions

GC-MS	:GCMS-QP2010 Ultra		
Column	:Rt-Q-BOND (30 mL. x 0.32 mmI.D., 10 μm) + Guard column (3 mL. x 0.32 mmI.D.)		
[GC]			[MS]
Vaporization chamber temperature	: 200 °C		Interface temperature: 200 °C
Column oven temperature:	35 °C (3 min) →(10 °C/min)→260 °C (5 min)		Ion source temperature: 200 °C
Injection mode	: Split		Measurement mode : Scan
Split ratio	: 30		Mass range : m/z 10 to 300
Carrier gas	: Helium		Event time : 0.3 sec
Control mode	:Linear velocity (61.6 cm/sec)		
Sample injection quantity	: 500 μL		

Results

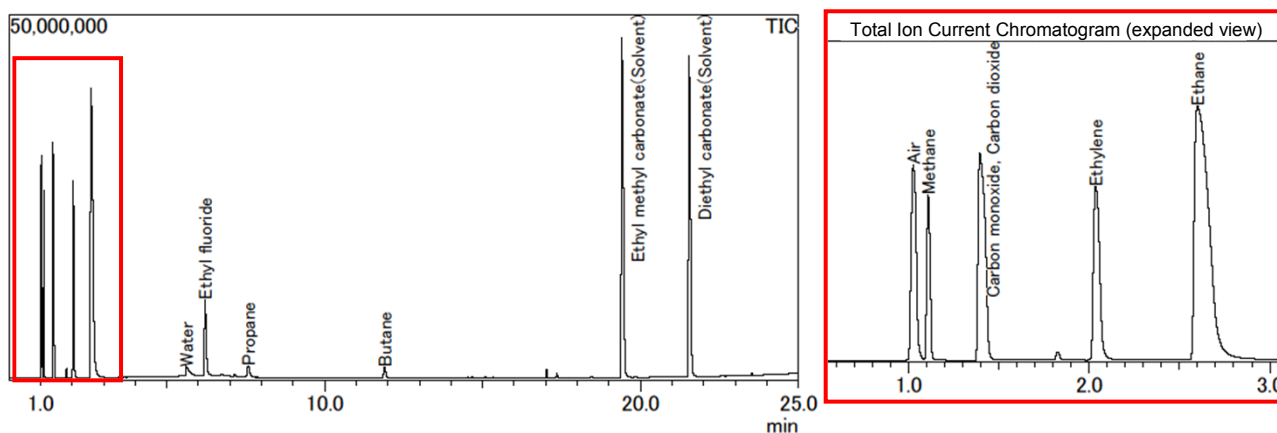


Fig. 1: Total Ion Current Chromatogram for Gas Generated from the Cell