Mass Spectrometry Application Group Mass Spectrometry Business Unit JEOL Ltd.

No.090

Analysis of advanced materials by FD/FI using "AccuTOF GC" Part II

~ analysis of multifunctional thiols, curing agents for functional polymers ~

Introduction

Field Ionization (FI) is a soft ionization method which ionizes analytes by electron tunneling from analyte molecules to a solid surface (emitter) in a high electric field. Vaporized analyte molecules are introduced to the proximity of the emitter.

We have analyzed multifunctional thiols, curing agents for functional polymers, by GC/EI and GC/FI methods and compared the mass spectra obtained.

Methods

Samples: multifunctional thiols (Showa Denko K.K.)

(1) Karenz MT® BD1($C_{12}H_{22}O_4S_2$)

(2) Karenz MT® PE1(C₂₁H₃₆O₈S₄)

GC conditions

Column: ZB-5ms, 30 m x 0.25 mm, film thickness: 0.25 μ m Carrier gas: Helium, 1.0 mL/min (constant flow rate mode)

Oven: 40 °C (2 min) \rightarrow 30 °C/min \rightarrow 280 °C (12 min)

MS conditions

Mass spectrometer: JMS-T100GC "AccuTOF GC"

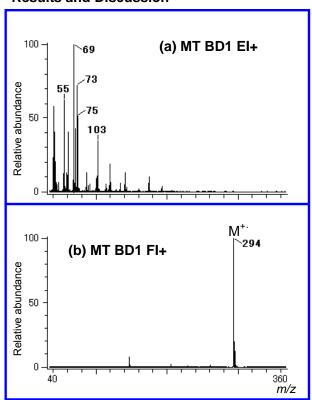
Ionization mode: EI: Electron energy: 70 eV, Ionization current: 300 μA

FI: Cathode potential: -10 kV, Emitter current: 0 mA

Acquired mass range: m/z 35 – 550

Spectral recording interval: 0.4 sec

Results and Discussion



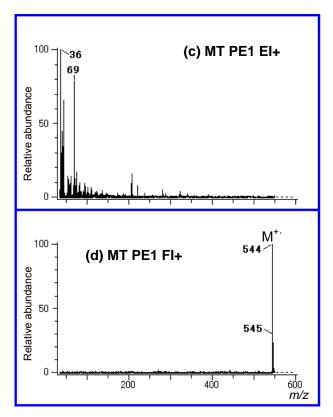


Fig. 1 Mass spectra of Karenz MT® BD1; (a) EI+, (b) FI+ Mass spectra of Karenz MT® PE1; (c) EI+, (d) FI+

For both Karenz MT® BD1 and PE1, which are multifunctional thiols, many fragment ions were observed with EI method while molecular ions were not observed at all. Molecular ions were very clearly observed by FI method for both samples while only a few fragment ions were observed, as shown in (b) and (d) of Fig. 1. The FI method was found suitable for analyzing multifunctional thiol compounds.

Acknowledgement

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