

## Analysis of Printer Toner Using Double-Shot Pyrolyzer and Peripheral Devices

### Part 2 : Analysis by Heart Cut EGA-GC/MS Technique

If more than one peak are observed in an evolved gas (EGA) curve, EGA-GC/MS is a useful technique to determine the composition of each peak observed. In this technique, components in each temperature region are introduced into a GC column and temporary trapped at the front of the column using Selective Sampler (SS-1010E) and MicroJet Cryo-Trap (MJT-1030E). They are then separated by GC and finally analyzed by MS. Using this technique, analysis of components in each peak allows detailed characterization of polymers. Fig. 2 shows chromatograms of evolved gases in regions A, B, and C of the EGA curve of a printer toner (Fig. 1) described in *Double-Shot Pyrolyzer® Application Note* PYA1-018E. 1.0mg each of sample from regions A and B was used for analysis because of low intensities, while 0.5mg from region C was used. A variety of nitrile compounds were found in region A, and region B contained methyl methacrylate (MMA) in addition to various aromatics (marked by \*) such as styrene (S), styrene dimer (SS), and styrene trimer (SSS). Thermal decomposition products of styrene-methyl methacrylate copolymer were detected in region C.

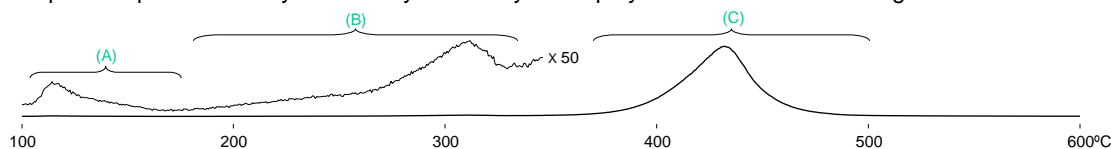


Fig.1 Heart Cutting region of EGA Curve of a Printer Toner

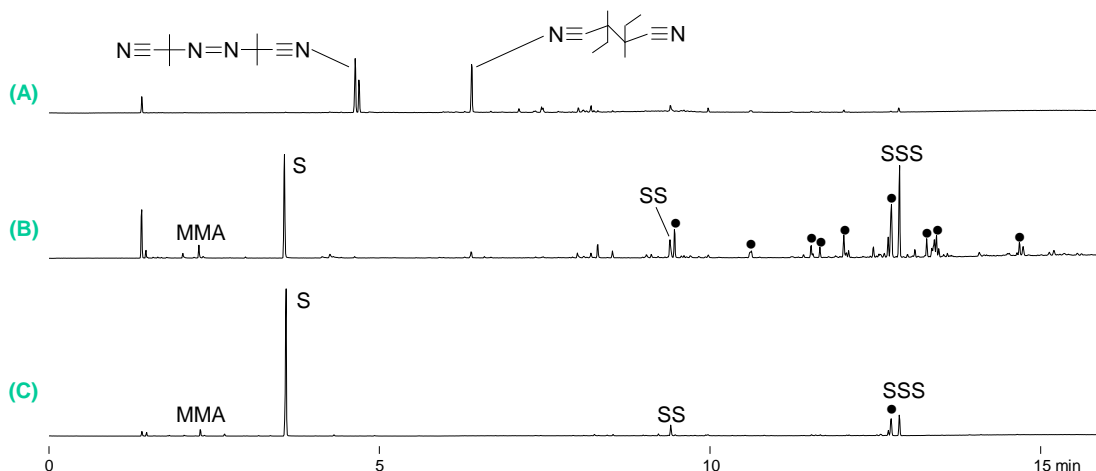


Fig. 2 Chromatograms of Each Temperature Regions of Evolved Gas Curve

Pyrolysis temp.:100–600°C (20°C/min), Split ratio : 1/50  
 Separation column : Ultra ALLOY~5 (5% diphenyl polysiloxane), 30m, 0.25mm id, Film thickness 0.25µm  
 GC temp.: 40–320°C (2min, 20°C/min), sample : (A),(B) 1.0mg, (C) 0.5mg, Detector : MS (m/z=29-400, 2scans/sec)

Keyword : Toner, Selective Sampler, MicroJet Cryo-Trap, EGA, EGA-GC/MS, styrene

Applications : General Polymer Analysis, Printing and Related Industries

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