

Analysis of Flame Retardant Polymers

Part 2 : Analysis of Evolved Gases (EGA) using Mass Spectrometer (MS)

Fig. 1 shows chromatograms of evolved gases from flame retardant polybutylene terephthalate (PBT, see *Double-Shot Pyrolyzer® Technical Note, PYA3-003E*). The chromatograms were obtained by programmed heating from 60 to 700°C, followed by GC analysis of resultant evolved gases that were trapped at the head of GC column. In addition to decomposed products from PBT, brominated phenols, thermal decomposition products of brominated PC, and $SbBr_3$, produced from brominated PC and antimonious oxide, were also detected. Fig. 2 shows evolved gas curves obtained using MS as a detector (TIC) and mass chromatograms of characteristic ions of species A~E (shown in Fig 1). Dibromo phenol was detected at 350°C; while flammable gases, hydrogen bromide, and antimony bromide, were detected at 380°C. Thus, in evolved gas analysis using MS, obtaining characteristic ions of target species provides an insight into thermal properties of polymeric materials.

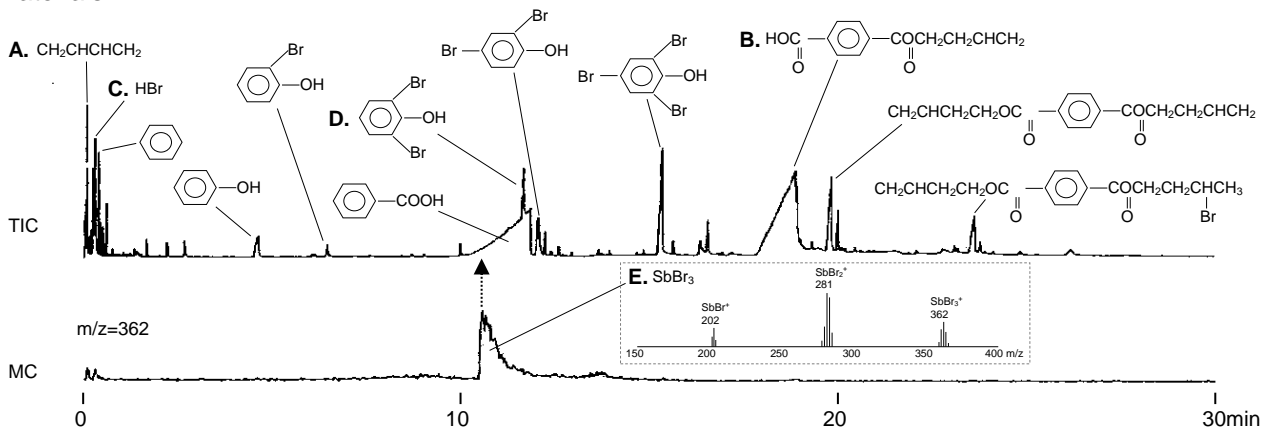


Fig. 1 Chromatograms of Thermal Decomposition Products of Flame Retardant PBT
Components evolved in 60~700°C range in He were trapped in Liq. N₂, then analyzed by GC/MS

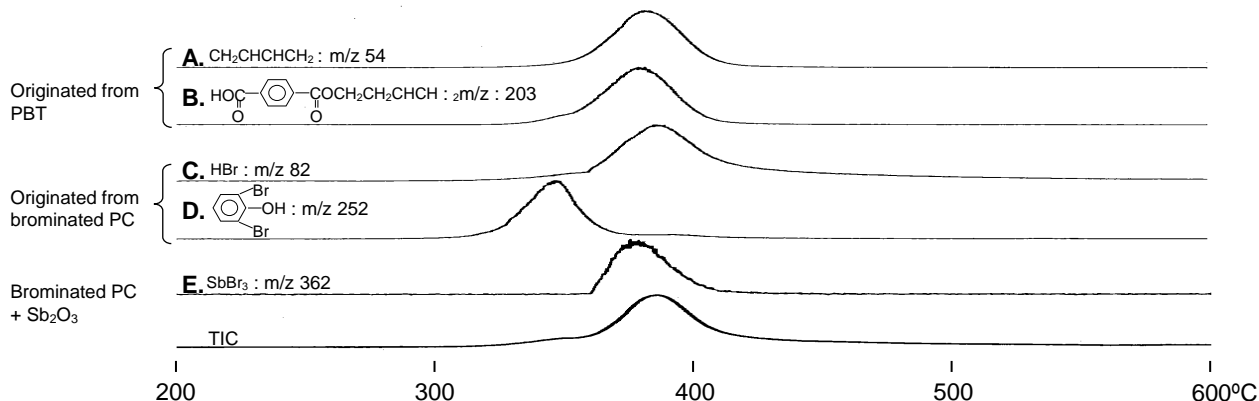


Fig. 2 EGA Curves of Flame Retardant PBT by EG/MS

Excerpt from Sato, H., Kondo, K., Tsuge, S., Ohtani, H. & Sato, N., *Polymer Degradation and Stability*, 1998, 62, 41-48

Keywords : Evolved Gas Analysis, Flame Retardant, PBT, Brominated PC, Antimonious Oxide

Products used : Multi-functional pyrolyzer, UA column, Deactivated metal capillary tube

Applications : General Polymer Analysis, Effectiveness of Additives

Related technical notes :

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