

Thermal Degradation Studies of Flame-Retarded PBT by Temperature Programmed Py-GC/MS

[Background] Studies of the degradation of flame retarded polymeric materials with use of conventional thermal analytical techniques such as thermogravimetry and differential thermal analysis have been reported. Here, temperature-programmed pyrolysis technique with MS as a detector was used to investigate the degradation.

[Experimental] Flame-retarded polybutyleneterephthalate (PBT) consisted of PBT/brominated polycarbonate/Sb₂O₃ (80/15/5wt%). All the polymer samples were cryo-milled into a fine powder at liquid N₂ temperature prior to measurements. Frontier Lab's PY-2010D pyrolyzer was connected to a quadrupole MS via Frontier Lab's Ultra ALLOY-1 capillary separation column. During programmed heating of the furnace (60~700 °C at 10°C/min), thermal degradation products were trapped at the head of the separation column which was coiled and immersed in N₂. Upon removing N₂, the oven temperature was then programmed (35~300 °C at 10°C/min).

[Results] The figure below shows the TIC chromatograms of the cold trapped products from (a) PBT, (b) Br-PC, (c) FR-PBT, and (d) mass chromatogram for m/z362 (parent ion of SbBr₃). The chromatogram for FR-PBT in Fig. 3(c) has components observed for both PBT and Br-PC together with additional peaks (14 and 18) due to Br-PBT derivatives. From these results, it was demonstrated that the technique should be useful to obtain detailed information on the synergistic flame-retardancy of halogenated organic compounds/Sb₂O₃ system.

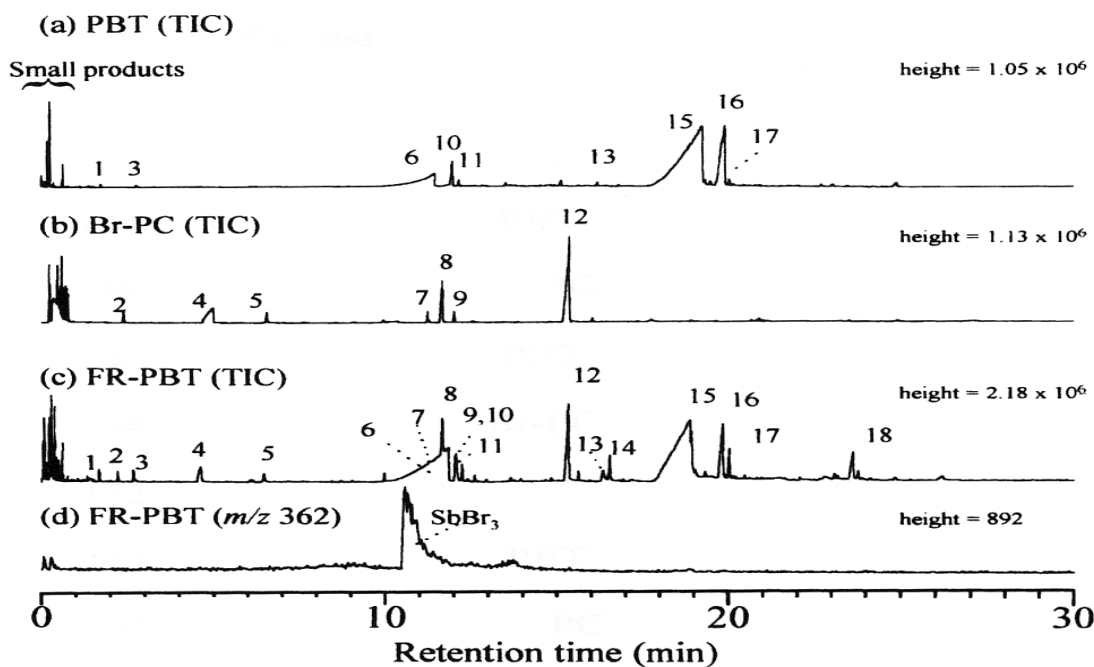


Figure. 1 Typical gas chromatograms of the degradation products from (a) PBT, (b) Br-PC, (c) FR-PBT, and (d) mass chromatogram for m/z362 (parent ion of SbBr₃).

*Contents excerpted from H. Sato, K. Kondo, S. Tsuge, H. Ohtani, N. Sato, *Polym. Degrad. Stab.*, 1998, **62**, 41-48

Keywords : Pyrolysis-GC-MS, Synergistic flame retardant system, FR-PBT, Thermal degradation

Products used : Multi-functional pyrolyzer, UA-1

Applications : Quality assurance, General polymer analysis

Related technical notes :

Please forward your inquiries via our web page or send us a fax message.

R&D and manufactured by :
Frontier Laboratories Ltd.

Phone: (81)24-935-5100 Fax: (81)24-935-5102
<http://www.frontier-lab.com/>