

Composition Analysis of Fully Aromatic Polyester by Py-GC Utilizing Reactive Pyrolysis

In analysis of polyesters and other condensation polymers by the Py-GC technique, reactive pyrolysis in the presence of tetramethyl ammonium hydroxide (TMAH) is very useful. Ester bonds of fully aromatic polyesters, in particular, are almost completely hydrolyzed with this method to give corresponding methylesters quantitatively. For example, Fig. 1 shows a pyrogram of reactive pyrolysis of a fully aromatic polyester made from p-hydroxy benzoic acid (PHB), terephthalic acid (TA) and 4,4-bisphenol (BP). Only the peaks of methyl derivatives of monomers are observed, indicating that the polyester is completely hydrolyzed into monomers. Fig. 2 shows the analysis result of another polyester prepared from the same monomers at different feed ratios. It is evident that the result is in a good agreement with the feed ratios. These results demonstrate that Py-GC utilizing reactive pyrolysis is a particularly useful technique for composition analysis of fully aromatic polyesters.

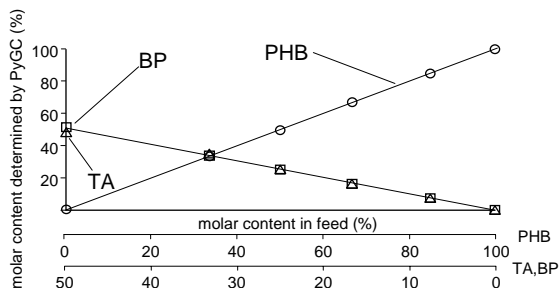


Fig. 2 Correlation of Composition Analysis Result and Monomers Feed Content of Fully Aromatic Polyester by Reactive Pyrolysis

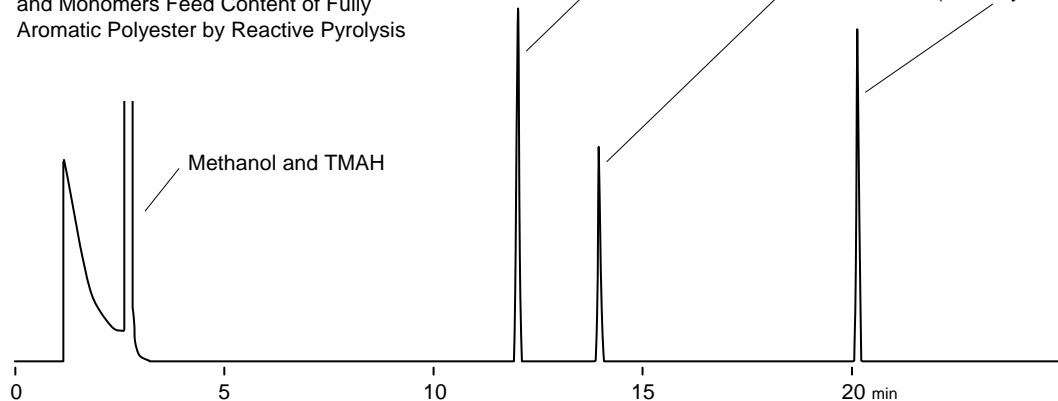
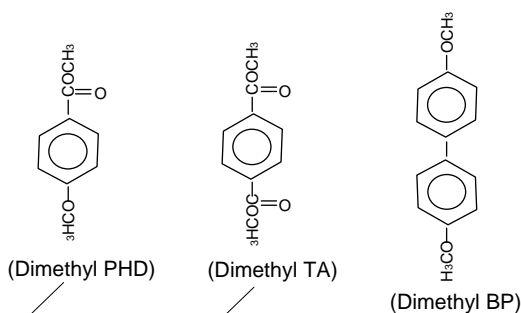


Fig. 1 Pyrogram of a Fully Aromatic Polyester by reactive pyrolysis

Pyrolyzer furnace temp.: 400°C, Carrier gas: N₂, Flow rate: 0.6mL/min, Split ratio: 1/80, Column: 5% diphenylpolysiloxane, Length: 30m, id: 0.25mm, Film thickness: 0.25µm, GC oven temp.: 80-280°C (at 8°C/min), Sample: 50µg, TMAH: 1µL (25wt% methanol solution), FID
 Courtesy from H.Ohtani and S.Tsuge of Nagoya University

Keyword : Aromatic Polyester, Composition Analysis, Reactive Pyrolysis, TMAH

Application : General Polymer Analysis

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