

Defect analysis of bristle base of ABS resin brushes using a pyrolyzer - Part 2 Pyrolysis (Py)-GC/MS -

[Background] In the previous note (PYA3-039E), evolved gas analysis (EGA) was conducted on brush bristle bases made of virgin and recycled ABS resins. In this note, attempts were made by means of pyrolysis (Py)-GC/MS to find out the cause of defect occurrence in the production process of brushes made of recycled ABS.

[Experimental] A part of each bristle-planted base of good and defective products was scraped off with a cutting knife and analyzed by a GC/MS system with a Multi-Shot Pyrolyzer directly interfaced to the GC injector. UA⁺-5 was used as a separation column. From the EGA thermograms (Fig. 1), the furnace temperature was determined to be 600 °C. The sample was introduced into the furnace heated at 600 °C for flash pyrolysis.

[Result] The pyrograms of the virgin and recycled resin samples (Fig. 2) show that the main peaks are of pyrolyzates derived from ABS resin, and that no significant differences are observed between the two samples. From the above, it is considered that the main composition of virgin and recycled ABS resins is almost the same, and that the cause of defect occurring is other than the main composition of the resin. In the next note (PYA1-141E), attempts were made to investigate the cause of defect occurrence by analyzing additive components.

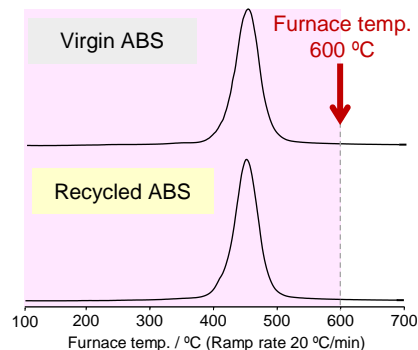


Fig. 1 EGA thermograms of virgin and recycled ABS resins.
(Extracted from technical note PYA3-039E)

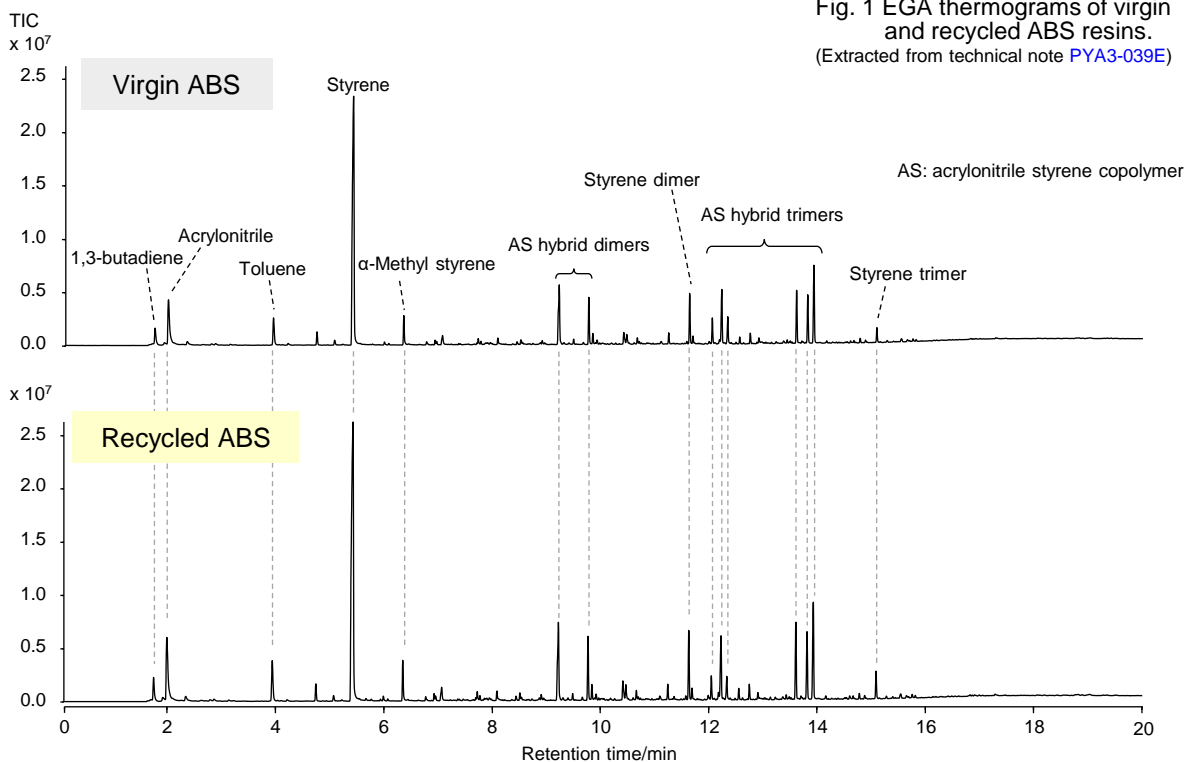


Fig. 2 Pyrograms of brush bristle bases made of virgin and recycled ABS resins.

Furnace temp.: 600 °C, GC injector temp.: 300 °C, GC oven temp.: 40 (2 min hold) - 320 °C (20 °C/min, 4 min hold), Split ratio: 1/100
Column flow rate: 1.0 mL/min (He), Separation column: UA⁺-5 (5 % diphenyl 95 % dimethylpolysiloxane), L=30 m, i.d.=0.25 mm, df=0.25 μm
MS scan range: m/z 29 - 600, MS scan rate: ca. 3 scan/s, Amount of sample: ca. 0.05 mg

Keywords : ABS resin, Recycled plastics, Defect analysis, Py-GC/MS, Pyrolysis

Products used : Multi-Shot Pyrolyzer, Auto-Shot Sampler, UA⁺-5, Eco-cup LF, Quartz wool, F-Search, Vent-free GC/MS adapter

Applications : General polymer analysis, Composition analysis, Quality assurance, Material analysis, Defect analysis

Related technical notes : PYA3-039E (Part 1), PYA1-141E (Part 3)

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