Quantitative Analysis of Trace Amount of Butadiene Rubber in High Impact Polystyrene (HIPS)

High impact polystyrene (HIPS) is a polystyrene (PS) copolymerized with a few percents of butadiene rubber in order to increase impact resistance of PS. Pyrolysis GC is used as a tool for quality control of HIPS. Quantitative analysis of a trace amount of butadiene present in HIPS is described here using Double-Shot Pyrolyzer®.

Fig. 1 shows a pyrogram of HIPS obtained at 550ºC. Butadiene (B) and styrene (S), monomer components of HIPS, have been detected. Table 1 shows peak area ratios of B and S (B/S) in the pyrograms obtained repeatedly. The excellent reproducibility of 0.62% was obtained. In the actual quantitative analysis, various mixing ratios of samples are used to produce a calibration curve.

Table 1. Peak Area Ratios of Butadiene (B) and Styrene (S) and Reproducibility

n	B/S (%)
1	1.249
2	1.244
3	1.246
4	1.254
5	1.233
Average	1.245
RSD (%)	0.62

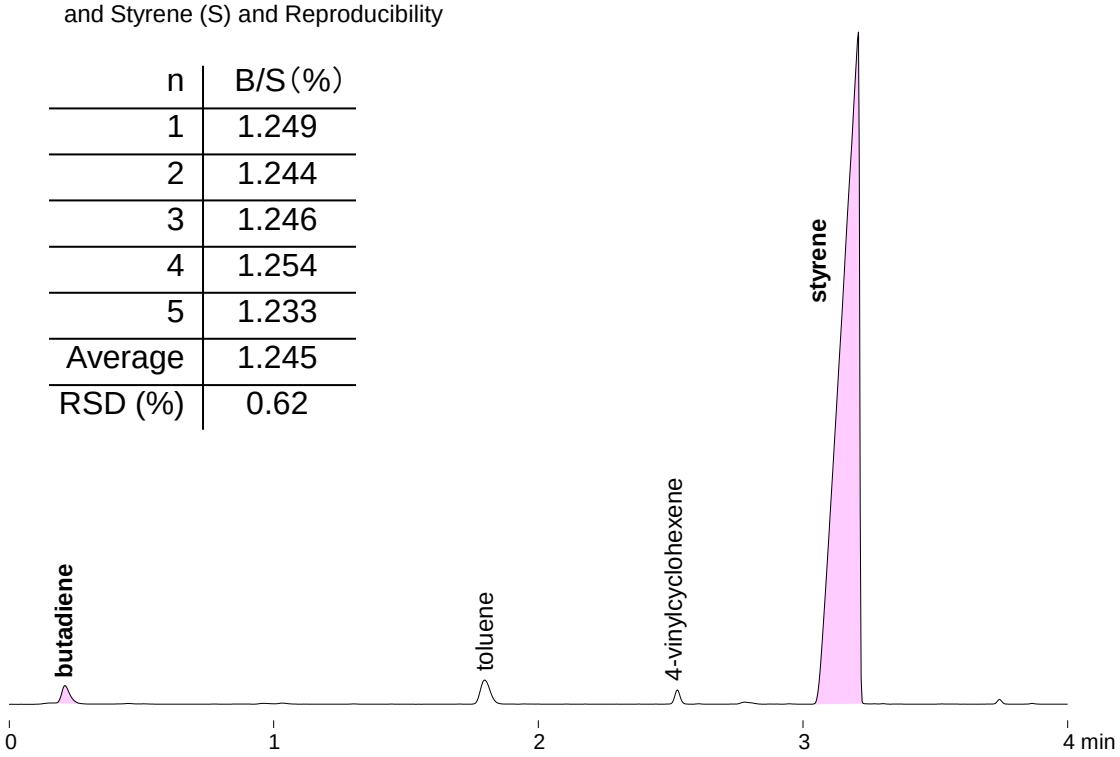

Fig. 1. Pyrogram of HIPS
Pyrolysis temp: 550ºC, Split ratio: 1/50, GC oven temp: 40~320ºC at 20ºC/min)
Separation column: Ultra ALLOY+-5 (5% diphenylpolysiloxane), Length 30m, Id 0.25mm, Film thickness 0.25µm
Sample amount : 100µg, Detector : Hydrogen flame detector (FID)

Keywords : Impact Resistance, Polystyrene, Butadiene, Quantitative Analysis, Reproducibility

Products used : Multi-functional pyrolyzer, UA-5

Applications : Plastics and Rubber Industry, General Polymer Analysis

Related technical notes :

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