



Analysis of Styrene-Acrylonitrile-Copolymer using Gel Permeation Chromatography

Angelika
Gratzfeld-Huesgen

Polymer/
chemical industry

Abstract

Styrene-Acrylonitrile-Copolymer (SAN) contains 25 to 35 % acrylnitril, it is highly resistant against oil and fuel and used for the production of housings, show cases, food packaging, cosmetics and pharmaceuticals. In 1989 65 000 tons were used in western Europe.

To ensure the highest quality, molecular weight (MW) data have to be evaluated for each batch of produced polymer. Gel Permeation Chromatography is an analytical tool used to characterize polymers which are soluble in organic solvents.

Method Performance

Figure 1 shows the signal traces of different treated SAN plastics. A granulate was used to produce colorless chips. The chips were then grinded and injection molded a second time. The influence of these production procedures on the MW data are shown in table 1.

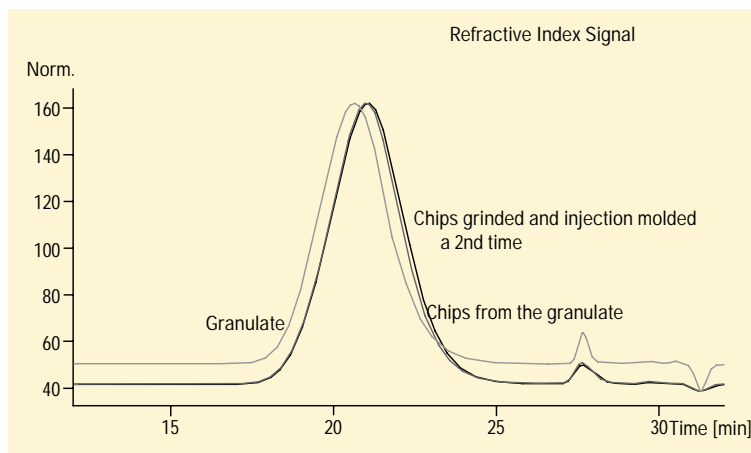


Figure 1
Styrene acrylonitrile from different production processes

Conditions

Column

3 ~ PLgel mixed-B, 7.5 ~ 300 mm, 5 μ m

Mobile phase

Tetrahydrofurane (THF)

Flow rate

1 ml/min

Oven Temp

20 $^{\circ}$ C

Injection vol

10 μ l

Refractive index detector

Sample preparation

Sample dissolved in 1 ml THF

Polystyrene standards from PSS were used for narrow standard calibration



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Method performance

Precision of weight: average molecular weight (rsd of Mw) = < 1 %

Precision of number weight: average molecular weight (rsd of Mn) = < 2 %

MW data	Granulate	Chips	Chips, grinded and injection molded a second time
Mp	86480	65812	62563
Mn	55525	42478	39616
Mw	117654	94559	91626
Polydispersity	2.119	2.226	2.313
Mz	224934	196436	195664
Mz + 1	408416	376650	393504
Mv	106412	84598	81671

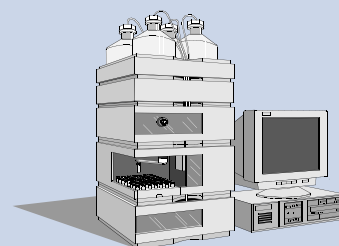
Table 1

The influence of the production procedures on the molecular weight data

Equipment

Agilent 1100 Series:

- isocratic pump
 - degasser (recommended)
 - autosampler
 - thermostatted column compartment
 - diode array detector and/or HP 1047A refractive index detector
- Agilent ChemStation
+ software
+ polymer labs GPC software



Angelika Gratzfeld-Huesgen is application chemist at Agilent Technologies, Waldbronn, Germany.

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