



Analysis of Acrylonitril-Butadiene-Styrene Copolymer using Gel Permeation Chromatography

Angelika
Gratzfeld-Huesgen

Polymer

Abstract

Acrylonitril-Butadiene-Styrene (ABS) copolymers are thermoplastic and elastic polymer blends that are used in the production of cars, housings, tubings, foils, sport kits and toys, where high impact strength, stability of shape and resistance against heat is required.

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.

MW data	Colored product	Starting product
Mp	61665	80398
Mn	33321	46523
Mw	101677	108226
Polydispersity	30.51	2.326
Mz	279324	222124

Method Performance

Figure 1 shows the overlay of a starting product and the respective colored end product. The differences in MW data are shown in table 1.

Table 1
Molecular weight data of two ABS polymers

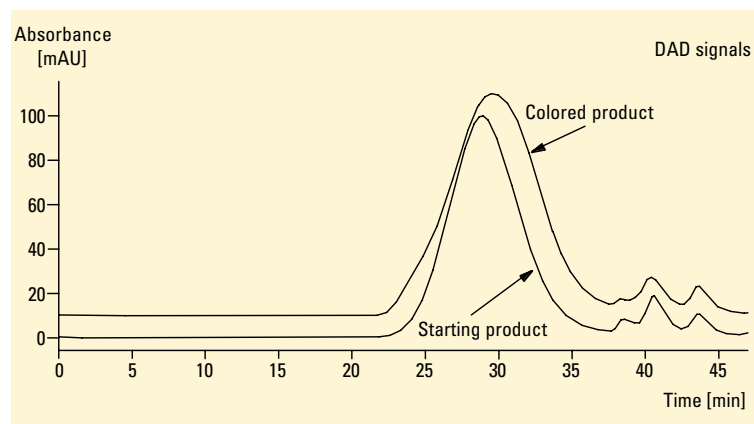


Figure 1
Molecular weight data of two ABS polymers

Conditions

Column

3 ~ PSS GPC, 8 ~ 300 mm, 5 µm
10⁶, 10⁵, 10³ A

Mobile phase Tetrahydrofuran (THF)

Flow rate 0.8 ml/min

Oven Temp 20 °C

Injection vol 10 µl

UV DAD 254/100 nm

Refractive index detector

Sample preparation

Sample dissolved in 1 ml THF, filtered with 0.45 µm filter

Polystyrene standards from PSS were used for narrow standard calibration



Agilent Technologies

Innovating the HP Way

Method performance

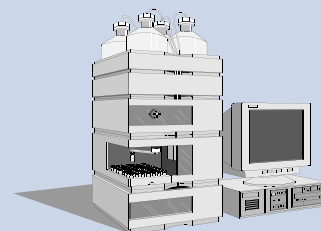
Precision of weight: average molecular weight (rsd of Mw) = < 1 %

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

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.

For more information on our products and services, visit our worldwide website at <http://www.agilent.com/chem>

© Copyright 1997 Agilent Technologies
Released 06/97
Publication Number 5965-9053E



Agilent Technologies

Innovating the HP Way