

## Analysis of Polystyrene Oligomers by Semi-micro GPC

### Introduction

Semi-micro analysis has the advantage in cutting cost by reducing the consumption of mobile phase. Columns with smaller particle sizes and reduced column dimensions are ideal for rapid high performance analysis and provide economical and ecological advantages in reducing the consumption of organic solvent in GPC analysis.

Using these more efficient columns together with a faster response detector, which can detect the sharper eluted peaks, offers a shorter measurement time. The RI-4035 refractive index detector with small flow cell volume is optimized for high-speed data acquisition for use in semi-micro scale analysis using columns with high performance packing material with smaller particles.

This report shows polystyrene oligomer analysis using a GPC column designed for high-performance analysis. Analysis using the LC-4000 Series RHPLC system results in a 30% solvent saving compared to conventional separations.

**Keyword:** semi-micro scale, high performance packing material, GPC, Refractive index detector, polystyrene oligomer, RHPLC

### Experimental

#### [Equipment]

Pump: PU-4185  
 Pump option: Degasser unit  
 Autosampler: AS-4150  
 Column oven: CO-4060  
 Detector: RI-4035

#### [Conditions]

Column: Shodex KF-401HQ (4.6 mmI.D. x 250 mmL, 3  $\mu$ m)  
 Eluent: THF (with stabilizer)  
 Flow rate: 0.3 mL/min  
 Column temp.: 25°C  
 Injection volume: 2  $\mu$ L  
 Sample: 0.2(w/v)% Polystyrene oligomer (Mw = 500) in eluent

### Result

Fig. 1 shows the chromatograms of polystyrene oligomer measured with RI-4035 (and RI-2031 for conventional HPLC).

The RI-4035 for semi-micro separations provide chromatograms with sharper peaks and better peak resolution.

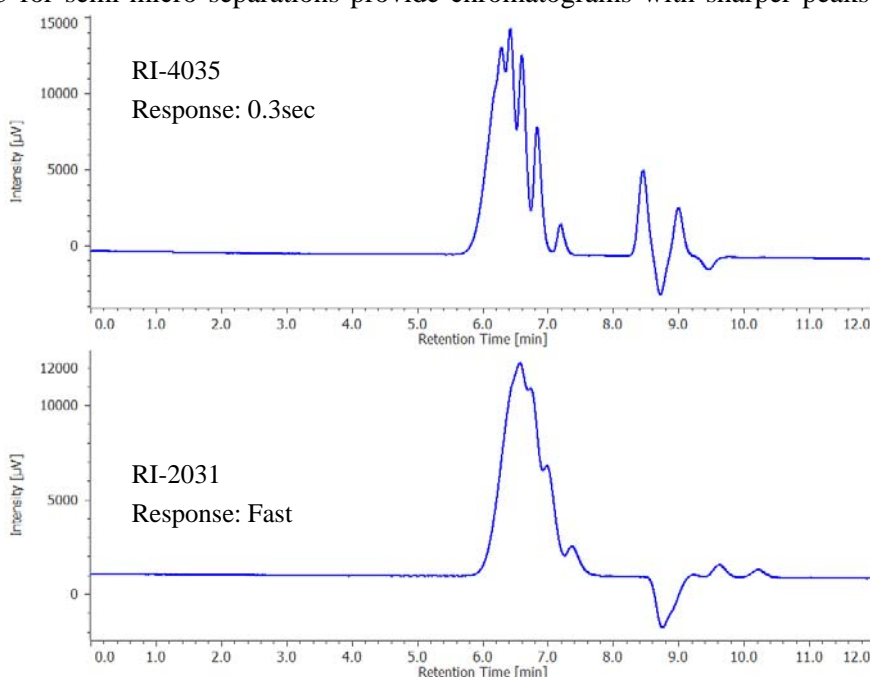


Fig. 1 Chromatogram of polystyrene oligomer  
 Top: RI-4035, Bottom: RI-2031

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Fig. 2 displays the chromatograms of polystyrene oligomers using RI-4035 with response 0.3 and 3 seconds illustrating that a faster response provides better peak resolution.

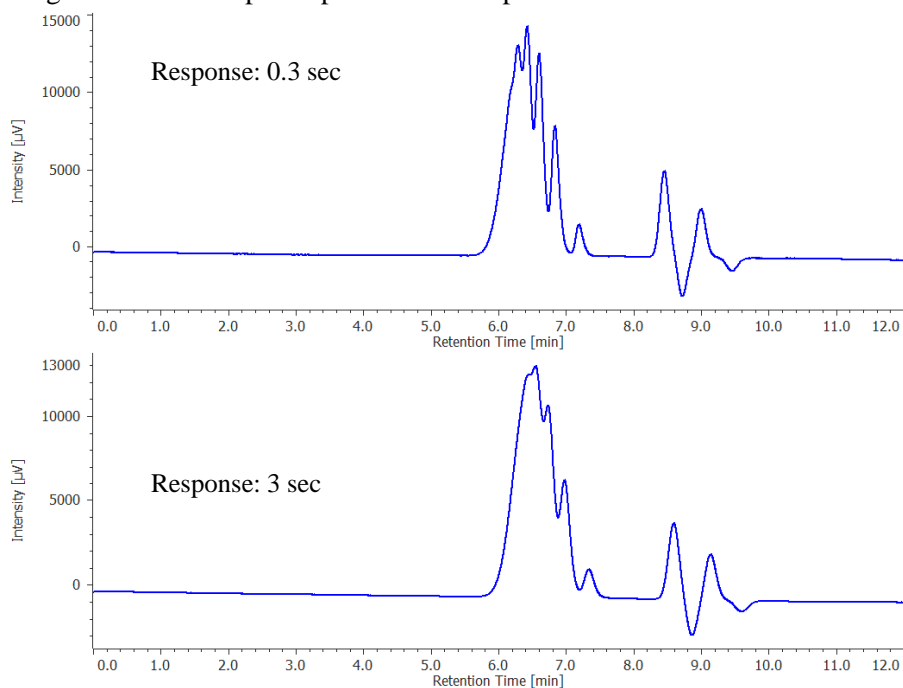


Fig. 2 Chromatogram of polystyrene oligomer for comparison of response.  
Top: 0.3 sec, Bottom: 3 sec

P/N	Description
7003-J014A	PU-4185 RHPLC Semi-micro Pump (Base Unit)
7006-H003A	DG-4000-04 4-channel Degasser Unit, for Analytical
7064-J002A	AS-4150 RHPLC Autosampler
7021-J002A	CO-4060 Column Oven
7031-J002A	RI-4035 Refractive Index Detector, for Semi-micro LC
7058-J011A	BS-4000-1 Bottle stand
6688-H564A	LC-Net CG cable (3x)
7059-J012A	ChromNAV Ver.2 Chromatography Data System
7001-H403A	RHPLC/UHPLC Start Up Kit for LC-4000
7001-H405A	Maintenance tool kit
	Shodex GPC KF-401HQ (4.6 mmI.D. x 250 mmL, 3 μm)