Performance of Refractive Index Detector (RI-4030) - Baseline -

Introduction

Reflective Index detector (RI detector) is widely used in HPLC analysis such as GPC measurement because of its versatility. RI detector detects the difference of refraction index of solvents, so the baseline was influenced by the room temperature change. To remove this influence of the room temperature, temperature control of the cell has been a solution for the problem. RI-4030 has more high-accurate temperature control function.

In this application note, comparison test results between RI-4030 and RI-2031 are implemented with using water as mobile phase. One is comparison of time in baseline stability after starting the cell temperature control. The other is comparison of measurement result of sugar alcohol.

Keyword: HPLC, Baseline, RI

Experimental Condition

Eluent :   Water
Flow rate: 1.0 mL/min
Cell temp.:   40 ℃

Results

Figure 1 shows the baseline with using RI-4030 and RI-2031. As shown in the figure, RI-4030 provides stability in 60 min after starting cell temperature control. RI-2031 provides stability in 160 min. The drift (approximately 0.3 µRIU/h) in 60 min is equivalent to the drift of baseline of polystyrene standard (0.05%(w/v)), which is shown in figure 2.
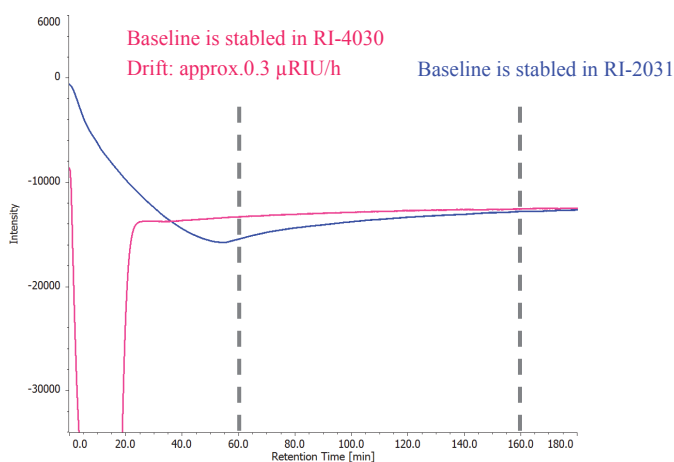*Some organic solvent make drift worse with cell temperature control.

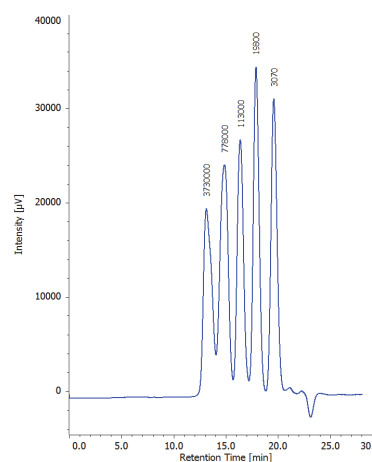Fig. 1 Baseline
Red: RI-4030, Blue: RI-2031

Fig. 2 Analysis of polystyrene 0.05%(w/v)
(drift: approx.0.3 µRIU/h)

The baseline noise of detectors affects to measurement sensitivity too. Under same system condition with RI-4030 or RI-2031, the comparison of noise and sensitivity (SN ratio) are measured and confired.

Figure 3 and 4 shows the measurement result of sugar alcohol with using RI-4030 and RI-2031. Table 1 shows the SN ratio of each peak.

In figure 3, the baseline looks stabled. But in figure 4, RI-4030 provides twice lower noise level than RI-2031 and the baseline is also stabled in RI-4030.

As shown in the table 1, RI-4030 can provides the twice higher SN ratio than RI-2031.

Experimental Condition

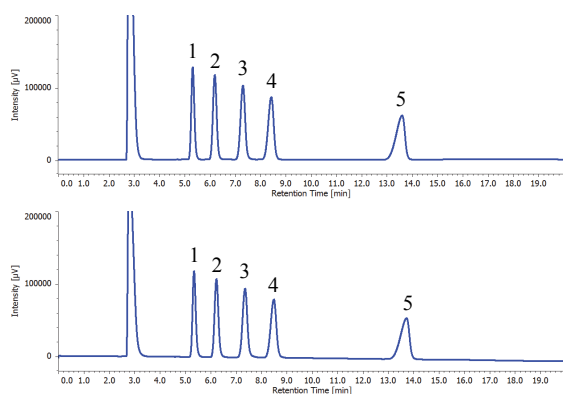|	
Column:	Inertsil Amide (4.6 mmI.D. x 250 mmL, 5 µm)
Eluent :	Water/Acetonitrile (30/70)
Flow rate:	1.0 mL/min
Column temp.:	30 ºC
Injection volume:	20 µL
Standard Sample:	Suger alchols mixture (5 mg/mL each)

Fig.3 Result of sugar alcohol measurement
Top: RI-4030, Bottom: RI-2031
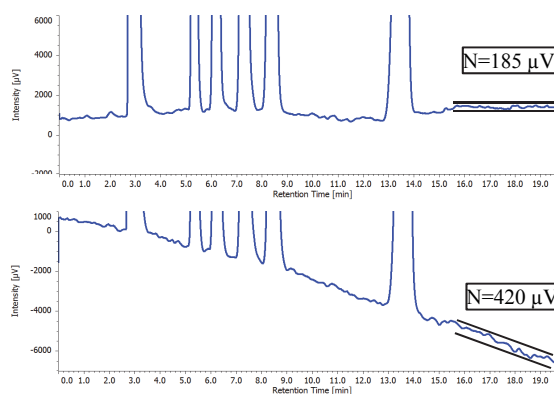1. Glycerine, 2. Erythritol, 3. Xylitol, 4. Solbitol, 5. Inositol

Fig.4 Zoom view of sugar alcohol measurement baseline
Top: RI-4030, Bottom: RI-2031

	Glycerine	Erythritol	Xylitol	Solbitol	Inositol
RI-4030	689.1	628.6	550.8	469.8	329.7
RI-2031	282.0	256.3	225.6	190.9	135.6

Table 1 Calculation result of SN ratio of each peak