



Recycling Preparative HPLC (Manual model)
LC-9210NEXT

Size Exclusion Chromatography JAIGEL-H Series Column

Point

JAIGEL-H series column is a cross-linked polystyrene packed SEC column for organic solvent.

This document contains the basic concept of SEC and polystyrene separation by different pore size of JAIGEL-H.

◆ Basics of SEC

Size Exclusion Chromatography (SEC), also called gel-filtration or gel-permeation chromatography (GPC), uses porous particles to separate molecules of different sizes from larger molecules to smaller molecules.

The same molecules elute together at the same retention time. The separation is all about differences in molecular size (Mw) and shape and this works very effectively for unknown samples.

SEC Separation behavior can be explained as Fig. 1 metaphorically.

There is a porous particle. Molecules that are larger than the pore size (light blue molecule) can not enter the pore and elute together as the first peak (called total exclusion), whereas molecules that are smaller than the pore size can enter the particles. The smaller molecules (light green molecule) can enter deeper and therefore have a longer path and longer transit time than larger molecules (orange molecule) that cannot enter the particles as deep.

Thus, the elution is in the order by molecule size from larger to smaller.

SEC is generally used to determine molecular weights and molecular weight distributions of unknown samples. This is also very useful for polymeric additive, surfactant, small molecules, oligomers, and polymers.

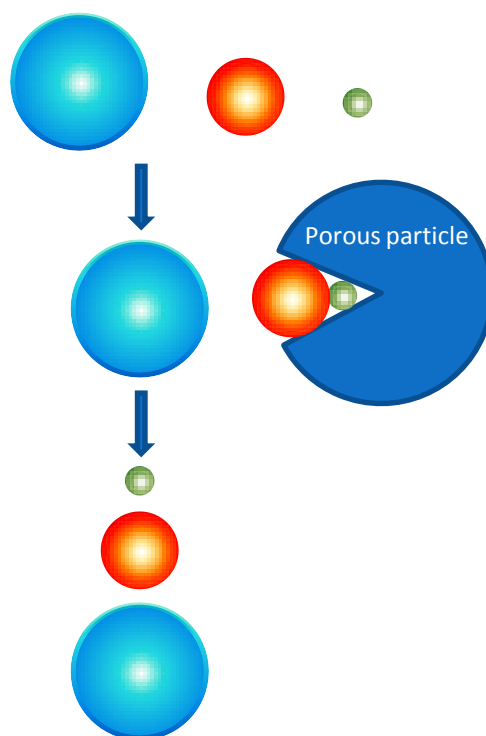


Fig. 1 Separation behavior model

◆ Column Selection

JAIGEL-H has 8 models shown at Table 1. The chromatogram below Fig.2 are to show standard Polystyrenes separation with JAIGEL-1H to 5H.

From each chromatograms, it is possible to compare with your sample Mw and select most suitable columns.

Generally speaking, with using PS standards, JAIGEL-1H targets to separate molecules below 400Mw, JAIGEL-2H is around 800(Mw), JAIGEL-2.5H is from 1000 to 3000(Mw), JAIGEL-3H is around 3000 to 10,000(Mw), JAIGEL-4H is 10,000 to 100,000(Mw).

Table 1.

Model	Exclusion Limit Mw (PS)	Theoretical Plate
JAIGEL-1H	1000	13000
JAIGEL-2H	5000	13000
JAIGEL-2.5H	20000	13000
JAIGEL-3H	70000	13000
JAIGEL-4H	5 x 10 ⁵	13000
JAIGEL-5H	5 x 10 ⁶	-
JAIGEL-6H	5 x 10 ⁷	-
JAIGEL-MH	2 x 10 ⁷	-

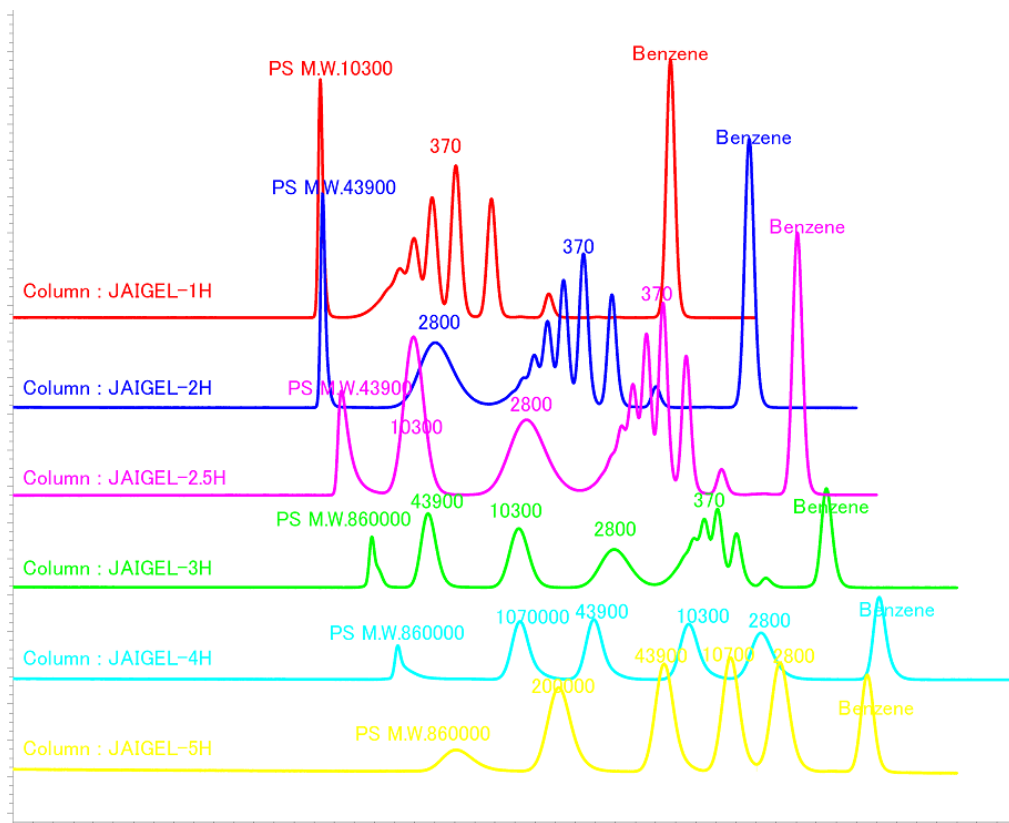


Fig. 2 Each Chromatograms with different JAIGEL H series columns