

GPC Analysis with HFIP Eluent

Refractory polymers are usually analyzed using a high-temperature GPC system. However, the high-temperature GPC system is rather expensive and not so easy to use. Since [HFIP](#)

(hexafluoroisopropanol) dissolves refractory polymers at ordinary temperature, such polymers are preferably analyzed with HFIP eluent without using high-temperature GPC systems. GPC is a method using the principle that larger molecular size (three dimensional volume) of the sample elutes faster. In fact, the actual molecular size of the sample is different according to the solvent in which the sample is dissolved. In case of polymers with ionic functional groups, these groups are repelling each other and the apparent molecular size of the polymers becomes larger. For preventing such ionic interaction, the addition of CF_3COONa (sodium trifluoroacetate) to HFIP is recommended.

For the analysis of polyamides or poly(ethylene terephthalate) (PET), the use of HFIP eluent containing CF_3COONa is also recommended.

(Refer to [Polyamide \(1\) Nylon6 \(HFIP-806M\)](#))

(Preparation of the eluent)

Since CF_3COONa is not easily dissolved in HFIP, care should be taken to confirm that it has been thoroughly dissolved, otherwise it may damage the columns.

Method for preparing the eluent is as follows:

- 1) Weigh necessary amount of CF_3COONa and dissolve it in HFIP applying ultrasonic vibration. The bottle should be shaken often to ensure thorough ultrasonic vibration.
- 2) Ultrasonic vibration should be applied for the following time: 10mM CF_3COONa in HFIP: 60 min. or more, 5mM CF_3COONa in HFIP: 40 min. or more
- 3) Use transparent bottle so that undissolved CF_3COONa can be seen.
- 4) During the analysis, the eluent bottle should be kept on a hot plate and the eluent should be stirred using a magnetic stirrer.

