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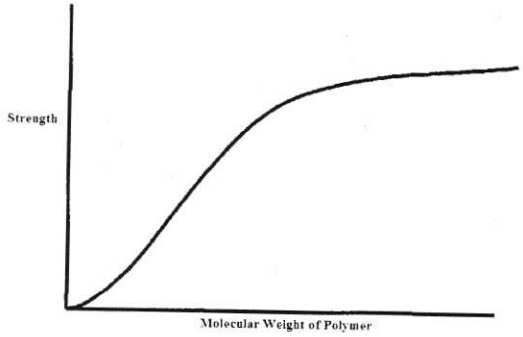
Molecular Weight of Polymers

1. Introduction

   Interrelation between molecular weight and physical properties of polymer and a couple of figures.



2. Molecular Weight of Polymers

   2.1. Number Average of Molecular Weight (M_n) (M_i = Molecular weight, N_i = Number of Molecules) ($M_n = \frac{\sum MiNi}{\sum Ni} = \frac{\text{Total Weight of Polymer}}{\text{Number of polymer}}$, Definition and calculation, and an example.)

   2.2. Weight Average of Molecular Weight (M_w) (M_i = Molecular weight, N_i = Number of Molecules) ($M_w = \frac{\sum NiMi^2}{\sum NiMi}$ =General formula of weight average of molecular weight. Definition, calculation, and an example.)

   2.3. Z-Average Molecular Weight (M_z) (M_i = Molecular weight, N_i = Number of Molecules) ($\frac{\sum NiMi^3}{\sum NiMi^2}$ = General formula of Z-Average molecular weight, Definition, calculation, and an example.)

   2.4. Viscosity Average Molecular Weight (M_v) (M_i = Molecular weight, N_i = Number of Molecules), ($M_v = \left(\frac{\sum NiMi^{1+a}}{\sum NiMi}\right)^{1/2}$ = General formula of Viscosity Average Molecular Weight. Definition, calculation, and an example.)

   2.5. Distribution of Molecular weight.

3. Molecular Weight Analysis of Polymers

3.1. Gel Permeation Chromatography (GPC) (features of GPC, scheme of GPC, strength and weakness of GPC and example figures)

3.2. Light-Scattering (The theory of Light-Scattering by polymer solutions, schematic of a light-scattering technique, ideal and non-ideal polymer solutions for light-scattering technique and strength and weakness of the technique)

3.3. X-Ray Scattering (Mechanism, strength and weakness of the technique)

3.4. Osmometry (Membrane and vapor osmometry, Mechanism and schematic of osmometry, advantages and disadvantages of the technique)

4. Conclusions
5. Referrences

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- The Molecular weight distribution of polymer samples, A. Horta and M. A. Pastoriza; Journal of Chemical Education, Vol. 84, No. 7, (2007)
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- Molecular weight determination of high polymers by means of vapor pressure osmometry and the solute dependence of the constant of the calibration, B. H. Bersted ; Journal of Applied Polymer Science, Vol. 17, PP. 1415-1430, (1973)
- On the Mechanism of X-Ray scattering, A. H. Compton; Physics, Vol. 11, (1925)
- Principle of Polymerization, 4th edition, George Odian, Willey Intersicence.
- Polymer Chemistry An Introduction, 3rd Edition, Malcolm P. Stevens, Oxford University Press.
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