

Exp. No. (9)

Successive Precipitation of Polymers

Introduction

Most of polymers are consisted of different chain length. So there are differences in their molecular weights. The polymer in this case is called (polydispersed) polymer, while polymer which have chain with similar in their molecular weight is called (monodispersed) polymer. Separation of mixture of molecules with different or similar molecular weights are impossible by the ordinary methods, like distillation or crystallization. Separation is often done by methods depend upon the ability of polymer chains to dissolve according to their molecular weights (their ability to dissolve is decrease as their molecular weight is increase). The separated parts with almostly similar range of molecular weight are measured in their molecular weights. The successive methods followed for separation of polymers according to their chain lengths:

1. Precipitation separation
2. Separation by using different solvent
3. Gradual thermal
4. Column separation

The method used in this experiment is precipitation method which depends on precipitating agent added to the polymer solution while the polymer molecules are not homogenous in their molecular weights so it precipitate gradually according to their molecular weights (this mean big molecular precipitate first then it is followed by the smaller one and so on).

Apparatus

1. Burette 25ml
2. Beaker 150ml
3. Glass rod

Reagent and materials

1. Polystyrene
2. Butyl acetate
3. Ethanol or methanol

Procedure

1. Dissolved 2.5g of polystyrene in 25ml *n*-butyl acetate.
2. Fill burette with precipitating agent like ethanol or methanol.
3. The precipitating agent is added stepwise from the burette with continuous stirring till white precipitate is appeared.
4. Stop the addition of the precipitating agent and separate the white precipitate.
5. The precipitating agent is further added as drops to the separated white precipitate for extra collection.
6. The remained clear solution is treated further with precipitating agent for collection of second part of polymer precipitate, and the procedure is repeated till three different polymer chain lengths are collected.

Each part is putted alone in individual crucible and left next week to dry, then its molecular weight will be calculated.