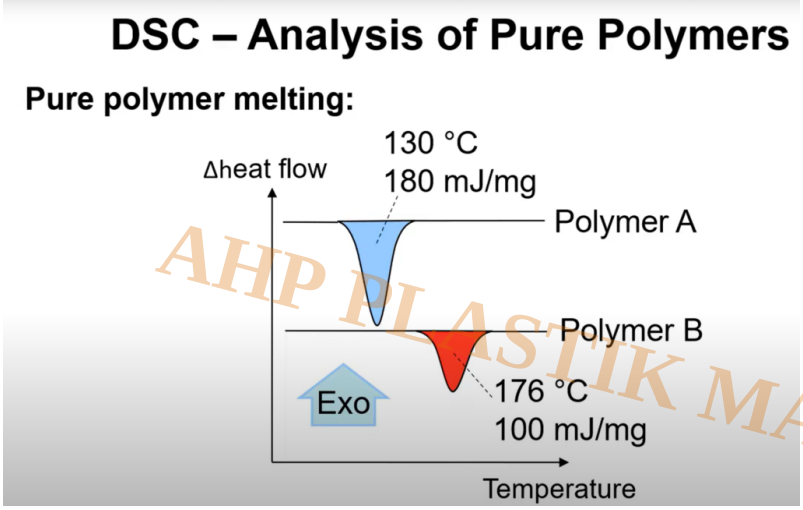
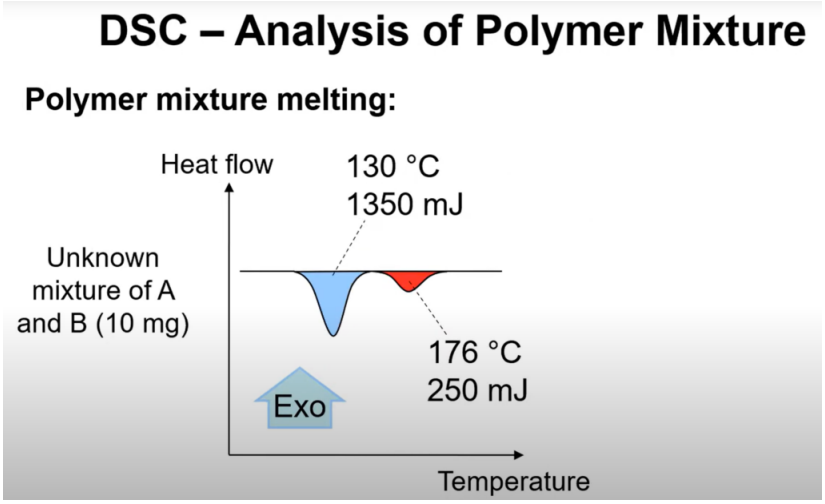
Differential Scanning Calorimetry â€“ Analysis of Polymer Mixture

Description

First thing we need to do is to analyze pure polymer.



In this example, polymers A and B are heated up in DSC, and the heat for melting is recorded. It is a specific enthalpy meaning measurement is presented as per mg of material. We use this information to quantify the mixture contents.



Here is the DSC graph of the mixture. The total weight is 10 mg of the sample piece. Total energy for each peak is measured, 1350 mJ and 250 mJ. Specific enthalpy is calculated based on the total energy divided by mass of the sample.

Specific melting enthalpy of polymer A:

$$\frac{1350\ \text{mJ}}{10\ \text{mg}} = 135\ \text{mJ/mg}$$

Specific melting enthalpy of polymer B:

$$\frac{250\ \text{mJ}}{10\ \text{mg}} = 25\ \text{mJ/mg}$$

Then the content analysis will be done as below:

$$\%\ \text{polymer A in mixture} = \frac{\text{Specific melting enthalpy of polymer A in mixture}}{\text{Specific melting enthalpy of pure polymer A}} \times 100\%$$

$$\%\ \text{polymer A in mixture} = \frac{135\ \text{mJ/mg}}{180\ \text{mJ/mg}} \times 100\% = 75\%$$

$$\%\ \text{polymer B in mixture} = \frac{\text{Specific melting enthalpy of polymer B in mixture}}{\text{Specific melting enthalpy of pure polymer B}} \times 100\%$$

$$\%\ \text{polymer B in mixture} = \frac{25\ \text{mJ/mg}}{100\ \text{mJ/mg}} \times 100\% = 25\%$$

Differential Scanning Calorimeter (DSC, OIT)-500C

Category

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