Important Crystallinity in Polymers Formulas PDF

Formulas
Examples
with Units

List of 9
Important Crystallinity in Polymers Formulas

1) Mass Fraction of Crystalline Components Formula

Evaluate Formula

Formula

$$\mu_c = \frac{m_c}{m}$$

Example with Units

$$0.4444 = \frac{4\,\text{g}}{9\,\text{g}}$$

2) Mass Fraction of Crystalline Components given Density Formula

Evaluate Formula

Formula

$$\mu_c = \frac{\rho_c \cdot v_c}{\rho \cdot v}$$

Example with Units

$$0.6078 = \frac{0.51\,\text{g/cm}^3 \cdot 4.3\,\text{m}^3}{0.41\,\text{g/cm}^3 \cdot 8.8\,\text{m}^3}$$

3) Mass Fraction of Crystalline Components given Specific Volume Formula

Evaluate Formula

Formula

$$\mu_c = \frac{v'_a - v'}{v'_a - v'_c}$$

Example with Units

$$0.4167 = \frac{5.1\,\text{cm}^3/\text{g} - 4.1\,\text{cm}^3/\text{g}}{5.1\,\text{cm}^3/\text{g} - 2.7\,\text{cm}^3/\text{g}}$$

4) Mass Fraction of Crystalline Regions Formula

Evaluate Formula

Formula

$$\mu_c = \frac{A_c}{A_c + A_a}$$

Example with Units

$$0.4375 = \frac{7\,\text{W/m}^2\text{*sr}}{7\,\text{W/m}^2\text{*sr} + 9\,\text{W/m}^2\text{*sr}}$$

5) Total Mass of Specimen Formula

Evaluate Formula

Formula

$$m = m_c + m_a$$

Example with Units

$$9\,\text{g} = 4\,\text{g} + 5\,\text{g}$$

6) Total Volume of Crystalline Components given Volume Fraction Formula

Evaluate Formula

Formula

$$v_c = \varepsilon_c \cdot v$$

Example with Units

$$4.4\,\text{m}^3 = 0.5 \cdot 8.8\,\text{m}^3$$

7) Total Volume of Specimen Formula

Evaluate Formula

Formula

$$v = v_c + v_a$$

Example with Units

$$8.8\,\text{m}^3 = 4.3\,\text{m}^3 + 4.5\,\text{m}^3$$

8) Volume Fraction of Crystalline Components Formula

Evaluate Formula

Formula

$$\varepsilon_c = \frac{v_c}{v}$$

Example with Units

$$0.4886 = \frac{4.3\,\text{m}^3}{8.8\,\text{m}^3}$$

9) Volume Fraction of Crystalline Components given Density Formula

Evaluate Formula

Formula

$$\varepsilon_c = \left(\frac{\rho - \rho_a}{\rho_c - \rho_a}\right)$$

Example with Units

$$0.4737 = \left(\frac{0.41\,\text{g/cm}^3 - 0.32\,\text{g/cm}^3}{0.51\,\text{g/cm}^3 - 0.32\,\text{g/cm}^3}\right)$$

Variables used in list of Crystallinity in Polymers Formulas above

- A_a Area Under Amorphous Hump *(Watt per Square Meter Steradian)*
- A_c Area Under Crystalline Peak *(Watt per Square Meter Steradian)*
- m Total Mass of Specimen *(Gram)*
- m_a Total Mass of Amorphous Components *(Gram)*
- m_c Total Mass of Crystalline Components *(Gram)*
- v Total Volume of Specimen *(Cubic Meter)*
- v' Specific Volume of Specimen *(Cubic Centimeter per Gram)*
- v_a Total Volume of Amorphous Components *(Cubic Meter)*
- v'_a Specific Volume of Amorphous Component *(Cubic Centimeter per Gram)*
- v_c Total Volume of Crystalline Components *(Cubic Meter)*
- v'_c Specific Volume of Crystalline Component *(Cubic Centimeter per Gram)*
- ε_c Volume Fraction of Crystalline Components
- μ_c Mass Fraction of Crystalline Components
- ρ Density of Specimen *(Gram per Cubic Centimeter)*
- ρ_a Density of Amorphous Component *(Gram per Cubic Centimeter)*
- ρ_c Density of Crystalline Component *(Gram per Cubic Centimeter)*

Constants, Functions, Measurements used in list of Crystallinity in Polymers Formulas above

- Measurement: **Weight** in Gram (g)
  Weight Unit Conversion
- Measurement: **Volume** in Cubic Meter (m^3)
  Volume Unit Conversion
- Measurement: **Density** in Gram per Cubic Centimeter (g/cm^3)
  Density Unit Conversion
- Measurement: **Specific Volume** in Cubic Centimeter per Gram (cm^3/g)
  Specific Volume Unit Conversion
- Measurement: **Radiance** in Watt per Square Meter Steradian ($W/m^{2}*sr$)
  Radiance Unit Conversion

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