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Crystallinity in Polymers Formulas

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List of 9 Crystallinity in Polymers Formulas

Crystallinity in Polymers

1) Mass Fraction of Crystalline Components

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

[Open Calculator !\[\]\(a870788d6ed9b8fd294b7654a8c8526b_img.jpg\)](#)

$$\text{ex } 0.444444 = \frac{4g}{9g}$$

2) Mass Fraction of Crystalline Components given Density

$$\text{fx } \mu_c = \frac{\rho_c \cdot V_c}{\rho \cdot V}$$

[Open Calculator !\[\]\(c50c8b7b2cc2cf9ff925edec0ee94c0d_img.jpg\)](#)

$$\text{ex } 0.607816 = \frac{0.51g/cm^3 \cdot 4.3m^3}{0.41g/cm^3 \cdot 8.8m^3}$$

3) Mass Fraction of Crystalline Components given Specific Volume

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

[Open Calculator !\[\]\(f60b7a900783ac3fd531bfd9c111be6d_img.jpg\)](#)

$$\text{ex } 0.416667 = \frac{5.1cm^3/g - 4.1cm^3/g}{5.1cm^3/g - 2.7cm^3/g}$$



4) Mass Fraction of Crystalline Regions

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

[Open Calculator !\[\]\(cbe80b694ebd74fcfe136a095b608235_img.jpg\)](#)

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

5) Total Mass of Specimen

$$fx \quad m = m_c + m_a$$

[Open Calculator !\[\]\(3e2231b1ad3ca8da8658228c00dd08e0_img.jpg\)](#)

$$ex \quad 9g = 4g + 5g$$

6) Total Volume of Crystalline Components given Volume Fraction

$$fx \quad v_c = \epsilon_c \cdot v$$

[Open Calculator !\[\]\(0d5ec72f61334709c3fc9450209b754f_img.jpg\)](#)

$$ex \quad 4.4m^3 = 0.5 \cdot 8.8m^3$$

7) Total Volume of Specimen

$$fx \quad v = v_c + v_a$$

[Open Calculator !\[\]\(b64b40baaee5acddc1eab8538ba84754_img.jpg\)](#)

$$ex \quad 8.8m^3 = 4.3m^3 + 4.5m^3$$

8) Volume Fraction of Crystalline Components

$$fx \quad \epsilon_c = \frac{v_c}{v}$$

[Open Calculator !\[\]\(aff7c69c44a5e015f18c35867ef3f5c3_img.jpg\)](#)

$$ex \quad 0.488636 = \frac{4.3m^3}{8.8m^3}$$



9) Volume Fraction of Crystalline Components given Density

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

[Open Calculator !\[\]\(e78f798d4ea5c530c9db49e7d26e6b95_img.jpg\)](#)

$$\text{ex } 0.473684 = \left(\frac{0.41\text{g/cm}^3 - 0.32\text{g/cm}^3}{0.51\text{g/cm}^3 - 0.32\text{g/cm}^3} \right)$$








Variables Used

- 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

- **Measurement: Weight** in Gram (g)
Weight Unit Conversion 
- **Measurement: Volume** in Cubic Meter (m³)
Volume Unit Conversion 
- **Measurement: Density** in Gram per Cubic Centimeter (g/cm³)
Density Unit Conversion 
- **Measurement: Specific Volume** in Cubic Centimeter per Gram (cm³/g)
Specific Volume Unit Conversion 
- **Measurement: Radiance** in Watt per Square Meter Steradian (W/m²*sr)
Radiance Unit Conversion 



Check other formula lists

- [Crystallinity in Polymers Formulas](#) 
- [Important Formulas of Polymers](#) 
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