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Spectrometric Characterization of Polymers Formulas

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List of 9 Spectrometric Characterization of Polymers Formulas

Spectrometric Characterization of Polymers

1) Binding Energy given Work Function

Open Calculator

fx $$E_{binding} = ([hP] \cdot v) - E_{kinetic} - \Phi$$

ex $$14.39997N*m = ([hP] \cdot 2.4E\hat{}34Hz) - 0.0026J - 1.5J$$

2) Change in Temperature given Thermal Conductivity

Open Calculator

fx $$\Delta T = \frac{Q \cdot L}{A_{sample} \cdot k}$$

ex $$4.902254K = \frac{125W \cdot 21m}{52.6m^2 \cdot 10.18W/(m*K)}$$

3) Density given Thermal Diffusivity

Open Calculator

fx $$\rho = \frac{k}{\alpha \cdot c}$$

ex $$0.000152kg/m^3 = \frac{10.18W/(m*K)}{16m^2/s \cdot 4.184kJ/kg*K}$$

4) Energy of Auger Electron

Open Calculator

fx $E_A = E_{o1} - E_i + E_{o2}$

ex $12.99V = 15V - 5.01V + 3V$

5) Heat of Polymerization

Open Calculator

fx $\Delta H_p = E_p - E_{dp}$

ex $20.55KJ/mol = 26.2KJ/mol - 5.65KJ/mol$

6) Kinetic Energy given Binding Energy

Open Calculator

fx $E_{kinetic} = ([hP] \cdot v) - E_{binding} - \Phi$

ex $0.002568J = ([hP] \cdot 2.4E\hat{}34Hz) - 14.4N*m - 1.5J$

7) Mobility given Conductivity

Open Calculator

fx $\mu_e = \frac{\sigma}{e^- \cdot [Charge\text{-}e]}$

ex $1E\hat{}17m^2/V*s = \frac{0.1S/m}{6 \cdot [Charge\text{-}e]}$

8) Specific Heat Capacity given Thermal Diffusivity

Open Calculator

fx $$c = \frac{k}{\alpha \cdot \rho}$$

ex $$4.241667\text{kJ/kg*K} = \frac{10.18\text{W/(m*K)}}{16\text{m}^2\text{/s} \cdot 0.00015\text{kg/m}^3}$$

9) Thermal Conductivity given Heat Flow Rate

Open Calculator

fx $$k = \frac{Q \cdot L}{A_{sample} \cdot \Delta T}$$

ex $$10.18468\text{W/(m*K)} = \frac{125\text{W} \cdot 21\text{m}}{52.6\text{m}^2 \cdot 4.9\text{K}}$$

Variables Used

- ΔT Change in Temperature *(Kelvin)*
- A_{sample} Sample Area *(Square Meter)*
- **c** Specific Heat Capacity *(Kilojoule per Kilogram per K)*
- E_A Energy of Auger Electron *(Volt)*
- $E_{binding}$ Binding Energy of Photoelectron *(Newton Meter)*
- E_{dp} Activation Energy for Depolymerization *(KiloJoule Per Mole)*
- E_i Energy of Inner Shell Electron *(Volt)*
- $E_{kinetic}$ Kinetic Energy of Photoelectron *(Joule)*
- E_{o1} Energy of Outer Shell Electron *(Volt)*
- E_{o2} Energy of Second Outer Shell Electron *(Volt)*
- E_p Activation Energy for Propagation *(KiloJoule Per Mole)*
- e^- Number of Electrons
- **k** Thermal Conductivity *(Watt per Meter per K)*
- **L** Thickness of Sample *(Meter)*
- **Q** Heat Flow Rate *(Watt)*
- **v** Frequency of Light *(Hertz)*
- **α** Thermal Diffusivity *(Square Meter Per Second)*
- ΔH_p Heat of Polymerization *(KiloJoule Per Mole)*
- μ_e Mobility of Electron *(Square Meter per Volt per Second)*
- **ρ** Density *(Kilogram per Cubic Meter)*
- **σ** Conductivity *(Siemens per Meter)*
- **Φ** Work Function *(Joule)*

Constants, Functions, Measurements used

- Constant: **[Charge-e]**, 1.60217662E-19 Coulomb
  Charge of electron
- Constant: **[hP]**, 6.626070040E-34 Kilogram Meter² / Second
  Planck constant
- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Temperature** in Kelvin (K)
  Temperature Unit Conversion
- Measurement: **Area** in Square Meter (m²)
  Area Unit Conversion
- Measurement: **Energy** in Joule (J)
  Energy Unit Conversion
- Measurement: **Power** in Watt (W)
  Power Unit Conversion
- Measurement: **Frequency** in Hertz (Hz)
  Frequency Unit Conversion
- Measurement: **Thermal Conductivity** in Watt per Meter per K (W/(m*K))
  Thermal Conductivity Unit Conversion
- Measurement: **Electric Potential** in Volt (V)
  Electric Potential Unit Conversion
- Measurement: **Specific Heat Capacity** in Kilojoule per Kilogram per K (kJ/kg*K)
  Specific Heat Capacity Unit Conversion
- Measurement: **Electric Conductivity** in Siemens per Meter (S/m)
  Electric Conductivity Unit Conversion

- Measurement: **Density** in Kilogram per Cubic Meter (kg/m³)
  Density Unit Conversion
- Measurement: **Torque** in Newton Meter (N*m)
  Torque Unit Conversion
- Measurement: **Diffusivity** in Square Meter Per Second (m²/s)
  Diffusivity Unit Conversion
- Measurement: **Energy Per Mole** in KiloJoule Per Mole (KJ/mol)
  Energy Per Mole Unit Conversion
- Measurement: **Mobility** in Square Meter per Volt per Second (m²/V*s)
  Mobility Unit Conversion

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