



Important Formulas of Adsorption Isotherm

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List of 11 Important Formulas of Adsorption Isotherm

Important Formulas of Adsorption Isotherm 🗗

1) Adsorption constant k using Freundlich Adsorption Constant 🗗



$$k = rac{x_{gas}}{m \cdot P_{gas}^{rac{1}{n}}}$$

$$= \frac{8g}{4g \cdot (0.215 Pa)^{\frac{1}{3}}}$$

2) Equilibrium Concentration of Aqueous Adsorbate using Freundlich Equation

$$\mathbf{c} = \left(\frac{\mathbf{M}}{(\mathbf{m} \cdot \mathbf{k})^n} \right)$$

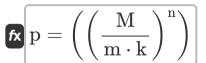
$$oxed{4770.507 = \left(rac{12 \mathrm{g}}{\left(4 \mathrm{g} \cdot 3.4
ight)^3}
ight)}$$

Open Calculator

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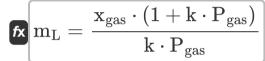
3) Equilibrium Pressure of Gaseous Adsorbate using Freundlich Equation



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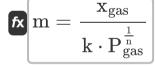
 $\boxed{\textbf{ex} \left[0.686953 = \left(\left(\frac{12 \text{g}}{4 \text{g} \cdot 3.4}\right)^3\right)\right]}$

4) Mass of Adsorbent for Langmuir Adsorption



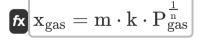
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5) Mass of Adsorbent using Freundlich Adsorption Isotherm



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6) Mass of Gas Adsorbed 🖸



Open Calculator

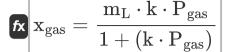
 $oxed{ex} 8.147388 ext{g} = 4 ext{g} \cdot 3.4 \cdot (0.215 ext{Pa})^{rac{1}{3}}$



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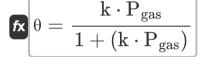
7) Mass of Gas Adsorbed in grams for Langmuir Adsorption 🗗



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$$= 8.023686 g = \frac{19g \cdot 3.4 \cdot 0.215 Pa}{1 + (3.4 \cdot 0.215 Pa)}$$

8) Surface Area of Adsorbent Covered



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9) Total Volume of Gas Adsorbed at Equilibrium by BET Equation 🖸

$$ext{V}_{ ext{total}} = rac{ ext{V}_{ ext{mono}} \cdot ext{C} \cdot \left(rac{ ext{P}_{ ext{v}}}{ ext{P}_{0}}
ight)}{\left(ext{P}_{ ext{v}} - \left(rac{ ext{P}_{ ext{v}}}{ ext{P}_{0}}
ight)
ight) \cdot \left(1 + \left(ext{C} \cdot \left(rac{ ext{P}_{ ext{v}}}{ ext{P}_{0}}
ight)
ight)
ight) - \left(rac{ ext{P}_{ ext{v}}}{ ext{P}_{0}}
ight)}$$

fx



10) Van Der Waals Interaction Energy 🛂

 $ext{IV} ext{U}_{ ext{VWaals}} = -rac{ ext{A}}{12 \cdot \pi \cdot ext{(h)}^2}$

Open Calculator 🗗

$$-8.3 ext{E^--27J} = -rac{3.2 ext{E^--21J}}{12 \cdot \pi \cdot (101 ext{m})^2}$$

11) Volume of Monolayer Gas by BET Equation

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$$ext{V}_{ ext{mono}} = rac{\left(ext{P}_{ ext{v}} - \left(rac{ ext{P}_{ ext{v}}}{ ext{P}_{0}}
ight)
ight) \cdot \left(1 + \left(ext{C} \cdot \left(rac{ ext{P}_{ ext{v}}}{ ext{P}_{0}}
ight)
ight)
ight) - \left(rac{ ext{P}_{ ext{v}}}{ ext{P}_{0}}
ight) \cdot ext{V}_{ ext{total}}}{ ext{C} \cdot \left(rac{ ext{P}_{ ext{v}}}{ ext{P}_{0}}
ight)}$$

$$\boxed{15215.29L = \frac{\left(6Pa - \left(\frac{6Pa}{21Pa}\right)\right) \cdot \left(1 + \left(2 \cdot \left(\frac{6Pa}{21Pa}\right)\right)\right) - \left(\frac{6Pa}{21Pa}\right) \cdot 998L}{2 \cdot \left(\frac{6Pa}{21Pa}\right)}}$$



Variables Used

- A Hamaker Coefficient (Joule)
- C Equilibrium Concentration of Aqueous Adsorbate
- C Adsorbent Constant
- h Surface Separation (Meter)
- k Adsorption Constant
- m Mass of Adsorbent (Gram)
- M Mass of Adsorbate (Gram)
- m_I Mass of Adsorbent for Langmuir Adsorption (Gram)
- n Freundlich Adsorption Constant
- p Equilibrium Pressure of the Gaseous Adsorbate
- P₀ Saturated Vapor Pressure of Gas (Pascal)
- Pgas Pressure of Gas (Pascal)
- P_v Vapour Pressure (Pascal)
- U_{VWaals} Van der Waals Interaction Energy (Joule)
- V_{mono} Monolayer Volume of Gas (*Liter*)
- V_{total} Total Equilibrium Volume of Gas (*Liter*)
- X_{qas} Mass of Gas Adsorbed (Gram)
- **0** Surface Area of Adsorbent covered





Constants, Functions, Measurements used

- Constant: pi, 3.14159265358979323846264338327950288
 Archimedes' constant
- Measurement: Length in Meter (m)
 Length Unit Conversion
- Measurement: Weight in Gram (g)
 Weight Unit Conversion
- Measurement: Volume in Liter (L)
 Volume Unit Conversion
- Measurement: Pressure in Pascal (Pa)
 Pressure Unit Conversion
- Measurement: Energy in Joule (J)
 Energy Unit Conversion





Check other formula lists

- BET Adsorption Isotherm
 Formulas
- Freundlich adsorption isotherm Formulas
- Important Formulas of Adsorption Formulas
- Important Formulas of Colloids
- Important Formulas on Surface
 Tension
- Langmuir Adsorption Isotherm

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