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Ionic Bonding Formulas

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List of 42 Ionic Bonding Formulas

Ionic Bonding

1) Charge of Ion given Ionic Potential

$$fx \quad q = \varphi \cdot r_{\text{ionic}}$$

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

$$ex \quad 0.3C = 300000V \cdot 10000A$$

2) Ionic Potential

$$fx \quad \varphi = \frac{q}{r_{\text{ionic}}}$$

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

$$ex \quad 300000V = \frac{0.3C}{10000A}$$

3) Radius of Ion given Ionic Potential

$$fx \quad r_{\text{ionic}} = \frac{q}{\varphi}$$

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

$$ex \quad 10000A = \frac{0.3C}{300000V}$$

Lattice Energy


4) Born Exponent using Born Lande Equation

$$fx \quad n_{\text{born}} = \frac{1}{1 - \frac{-U \cdot 4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot r_0}{[\text{Avaga-no}] \cdot M \cdot ([\text{Charge-e}]^2) \cdot z^+ \cdot z^-}}$$

[Open Calculator !\[\]\(166772600a13ad0a433053f90fe45649_img.jpg\)](#)

$$ex \quad 0.992649 = \frac{1}{1 - \frac{-3500J/\text{mol} \cdot 4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot 60A}{[\text{Avaga-no}] \cdot 1.7 \cdot ([\text{Charge-e}]^2) \cdot 4C \cdot 3C}}$$



5) Born Exponent using Born-Lande equation without Madelung Constant 

$$fx \quad n_{\text{born}} = \frac{1}{1 - \frac{-U \cdot 4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot r_0}{[\text{Avaga-no}] \cdot N_{\text{ions}} \cdot 0.88 \cdot ([\text{Charge-e}]^2) \cdot z^+ \cdot z^-}}$$

Open Calculator 


$$ex \quad 0.992897 = \frac{1}{1 - \frac{-3500\text{J/mol} \cdot 4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot 60\text{A}}{[\text{Avaga-no}] \cdot 2 \cdot 0.88 \cdot ([\text{Charge-e}]^2) \cdot 4\text{C} \cdot 3\text{C}}}$$

6) Born Exponent using Repulsive Interaction 

$$fx \quad n_{\text{born}} = \frac{\log 10 \left(\frac{B}{E_R} \right)}{\log 10} (r_0)$$

Open Calculator 

$$ex \quad 0.992644 = \frac{\log 10 \left(\frac{40000}{5.8E^{-12}\text{J}} \right)}{\log 10} (60\text{A})$$


7) Constant depending on compressibility using Born-Mayer equation 

$$fx \quad \rho = \left(\left(\frac{U \cdot 4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot r_0}{[\text{Avaga-no}] \cdot M \cdot z^+ \cdot z^- \cdot ([\text{Charge-e}]^2)} \right) + 1 \right) \cdot r_0$$

Open Calculator 


$$ex \quad 60.44435\text{A} = \left(\left(\frac{3500\text{J/mol} \cdot 4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot 60\text{A}}{[\text{Avaga-no}] \cdot 1.7 \cdot 4\text{C} \cdot 3\text{C} \cdot ([\text{Charge-e}]^2)} \right) + 1 \right) \cdot 60\text{A}$$



8) Electrostatic Potential Energy between pair of Ions [Open Calculator](#) 


$$\text{fx } E_{\text{Pair}} = \frac{-(q^2) \cdot ([\text{Charge-e}]^2)}{4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot r_0}$$

$$\text{ex } -3.5\text{E}^{-21}\text{J} = \frac{-((0.3\text{C})^2) \cdot ([\text{Charge-e}]^2)}{4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot 60\text{A}}$$

9) Lattice Energy using Born Lande Equation [Open Calculator](#) 

$$\text{fx } U = -\frac{[\text{Avaga-no}] \cdot M \cdot z^+ \cdot z^- \cdot ([\text{Charge-e}]^2) \cdot \left(1 - \left(\frac{1}{n_{\text{born}}}\right)\right)}{4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot r_0}$$


$$\text{ex } 3523.343\text{J/mol} = -\frac{[\text{Avaga-no}] \cdot 1.7 \cdot 4\text{C} \cdot 3\text{C} \cdot ([\text{Charge-e}]^2) \cdot \left(1 - \left(\frac{1}{0.9926}\right)\right)}{4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot 60\text{A}}$$

10) Lattice Energy using Born-Lande equation using Kapustinskii Approximation [Open Calculator](#) 

$$\text{fx } U = -\frac{[\text{Avaga-no}] \cdot N_{\text{ions}} \cdot 0.88 \cdot z^+ \cdot z^- \cdot ([\text{Charge-e}]^2) \cdot \left(1 - \left(\frac{1}{n_{\text{born}}}\right)\right)}{4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot r_0}$$

$$\text{ex } 3647.696\text{J/mol} = -\frac{[\text{Avaga-no}] \cdot 2 \cdot 0.88 \cdot 4\text{C} \cdot 3\text{C} \cdot ([\text{Charge-e}]^2) \cdot \left(1 - \left(\frac{1}{0.9926}\right)\right)}{4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot 60\text{A}}$$



11) Lattice Energy using Born-Mayer equation 

fx

Open Calculator 

$$U = \frac{-[\text{Avaga-no}] \cdot M \cdot z^+ \cdot z^- \cdot ([\text{Charge-e}]^2) \cdot \left(1 - \left(\frac{\rho}{r_0}\right)\right)}{4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot r_0}$$

ex

$$3465.763\text{J/mol} = \frac{-[\text{Avaga-no}] \cdot 1.7 \cdot 4\text{C} \cdot 3\text{C} \cdot ([\text{Charge-e}]^2) \cdot \left(1 - \left(\frac{60.44\text{\AA}}{60\text{\AA}}\right)\right)}{4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot 60\text{\AA}}$$

12) Lattice Energy using Kapustinskii equation 

fx

Open Calculator 

$$U_{\text{Kapustinskii}} = \frac{1.20200 \cdot (10^{-4}) \cdot N_{\text{ions}} \cdot z^+ \cdot z^- \cdot \left(1 - \left(\frac{3.45 \cdot (10^{-11})}{R_c + R_a}\right)\right)}{R_c + R_a}$$

ex

$$246889\text{J/mol} = \frac{1.20200 \cdot (10^{-4}) \cdot 2 \cdot 4\text{C} \cdot 3\text{C} \cdot \left(1 - \left(\frac{3.45 \cdot (10^{-11})}{65\text{\AA} + 51.5\text{\AA}}\right)\right)}{65\text{\AA} + 51.5\text{\AA}}$$

13) Lattice Energy using Lattice Enthalpy 

fx

Open Calculator 

$$U = \Delta H - (P_{\text{LE}} \cdot V_{\text{m_LE}})$$

ex

$$3500\text{J/mol} = 21420\text{J/mol} - (800\text{Pa} \cdot 22.4\text{m}^3/\text{mol})$$

14) Lattice Energy using Original Kapustinskii equation 

fx

Open Calculator 

$$U_{\text{Kapustinskii}} = \frac{\left(\left(\frac{[\text{Kapustinskii_C}]}{1.20200}\right) \cdot 1.079\right) \cdot N_{\text{ions}} \cdot z^+ \cdot z^-}{R_c + R_a}$$

ex

$$222283.3\text{J/mol} = \frac{\left(\left(\frac{[\text{Kapustinskii_C}]}{1.20200}\right) \cdot 1.079\right) \cdot 2 \cdot 4\text{C} \cdot 3\text{C}}{65\text{\AA} + 51.5\text{\AA}}$$




15) Lattice Enthalpy using Lattice Energy 

$$\text{fx } \Delta H = U + (P_{LE} \cdot V_{m_LE})$$

Open Calculator 

$$\text{ex } 21420\text{J/mol} = 3500\text{J/mol} + (800\text{Pa} \cdot 22.4\text{m}^3/\text{mol})$$

16) Minimum Potential Energy of Ion 

fx

Open Calculator 

$$E_{\min} = \left(\frac{-(q^2) \cdot ([\text{Charge-e}]^2) \cdot M}{4 \cdot \pi \cdot [\text{Permitivity-vacuum}] \cdot r_0} \right) + \left(\frac{B}{r_0^n - \{\text{born}\}} \right)$$


$$\text{ex } 5.8\text{E}^{\wedge}12\text{J} = \left(\frac{-((0.3\text{C})^2) \cdot ([\text{Charge-e}]^2) \cdot 1.7}{4 \cdot \pi \cdot [\text{Permitivity-vacuum}] \cdot 60\text{A}} \right) + \left(\frac{40000}{(60\text{A})^{0.9926}} \right)$$

17) Number of Ions using Kapustinskii Approximation 

$$\text{fx } N_{\text{ions}} = \frac{M}{0.88}$$

Open Calculator 

$$\text{ex } 1.931818 = \frac{1.7}{0.88}$$


18) Outer Pressure of Lattice 

$$\text{fx } P_{LE} = \frac{\Delta H - U}{V_{m_LE}}$$

Open Calculator 

$$\text{ex } 800\text{Pa} = \frac{21420\text{J/mol} - 3500\text{J/mol}}{22.4\text{m}^3/\text{mol}}$$



19) Repulsive Interaction 

$$\text{fx } E_R = \frac{B}{r_0^n - \{\text{born}\}}$$

Open Calculator 

$$\text{ex } 5.8E^{12}J = \frac{40000}{(60A)^{0.9926}}$$

20) Repulsive Interaction Constant 

$$\text{fx } B = E_R \cdot (r_0^n - \{\text{born}\})$$

Open Calculator 

$$\text{ex } 40033.26 = 5.8E^{12}J \cdot ((60A)^{0.9926})$$

21) Repulsive Interaction Constant given Madelung constant 

$$\text{fx } B_M = \frac{M \cdot (q^2) \cdot ([\text{Charge-e}]^2) \cdot (r_0^{n_{\text{born}}-1})}{4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot n_{\text{born}}}$$

Open Calculator 

$$\text{ex } 4.1E^{-29} = \frac{1.7 \cdot ((0.3C)^2) \cdot ([\text{Charge-e}]^2) \cdot ((60A)^{0.9926-1})}{4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot 0.9926}$$

22) Repulsive Interaction Constant given Total Energy of Ion and Madelung Energy 

$$\text{fx } B = (E_{\text{total}} - (E_M)) \cdot (r_0^n - \{\text{born}\})$$

Open Calculator 

$$\text{ex } 39964.23 = (5.79E^{12}J - (-5.9E^{-21}J)) \cdot ((60A)^{0.9926})$$



23) Repulsive Interaction Constant using Total Energy of Ion 


fx

Open Calculator 

$$B = \left(E_{\text{total}} - \left(-\frac{M \cdot (q^2) \cdot ([\text{Charge-e}]^2)}{4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot r_0} \right) \right) \cdot (r_0^n - \{\text{born}\})$$

ex

$$39964.23 = \left(5.79E^{12}J - \left(-\frac{1.7 \cdot ((0.3C)^2) \cdot ([\text{Charge-e}]^2)}{4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot 60A} \right) \right) \cdot ((60A)^{0.9926})$$

24) Repulsive Interaction using Total Energy of Ion 

fx

$$E_R = E_{\text{total}} - (E_M)$$

Open Calculator 

$$\text{ex } 5.8E^{12}J = 5.79E^{12}J - (-5.9E^{-21}J)$$

25) Repulsive Interaction using Total Energy of ion given charges and distances 


fx

$$E_R = E_{\text{total}} - \frac{-(q^2) \cdot ([\text{Charge-e}]^2) \cdot M}{4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot r_0}$$

Open Calculator 

$$\text{ex } 5.8E^{12}J = 5.79E^{12}J - \frac{-((0.3C)^2) \cdot ([\text{Charge-e}]^2) \cdot 1.7}{4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot 60A}$$



26) Total Energy of Ion given Charges and Distances 

fx

Open Calculator 

$$E_{\text{total}} = \left(\frac{-(q^2) \cdot ([\text{Charge-e}]^2) \cdot M}{4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot r_0} \right) + \left(\frac{B}{r_0^n - \{\text{born}\}} \right)$$

ex $5.8E^{12}J = \left(\frac{-((0.3C)^2) \cdot ([\text{Charge-e}]^2) \cdot 1.7}{4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot 60A} \right) + \left(\frac{40000}{(60A)^{0.9926}} \right)$

27) Total Energy of Ion in Lattice 

fx $E_{\text{total}} = E_M + E_R$

Open Calculator 


ex $5.8E^{12}J = -5.9E^{-21}J + 5.8E^{12}J$

28) Volume change of lattice 

fx $V_{m_LE} = \frac{\Delta H - U}{P_{LE}}$

Open Calculator 

ex $22.4m^3/mol = \frac{21420J/mol - 3500J/mol}{800Pa}$

Distance of Closest Approach 29) Distance of Closest Approach using Born Lande equation 

fx

Open Calculator 

$$r_0 = - \frac{[\text{Avaga-no}] \cdot M \cdot z^+ \cdot z^- \cdot ([\text{Charge-e}]^2) \cdot \left(1 - \left(\frac{1}{n_{\text{born}}}\right)\right)}{4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot U}$$

ex $60.40016A = - \frac{[\text{Avaga-no}] \cdot 1.7 \cdot 4C \cdot 3C \cdot ([\text{Charge-e}]^2) \cdot \left(1 - \left(\frac{1}{0.9926}\right)\right)}{4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot 3500J/mol}$



30) Distance of Closest Approach using Born-Lande Equation without Madelung Constant

fx

Open Calculator 

$$r_0 = - \frac{[\text{Avaga-no}] \cdot N_{\text{ions}} \cdot 0.88 \cdot z^+ \cdot z^- \cdot \left([\text{Charge-e}]^2 \right) \cdot \left(1 - \left(\frac{1}{n_{\text{born}}} \right) \right)}{4 \cdot \pi \cdot [\text{Permitivity-vacuum}] \cdot U}$$

ex

$$62.53193\text{A} = - \frac{[\text{Avaga-no}] \cdot 2 \cdot 0.88 \cdot 4\text{C} \cdot 3\text{C} \cdot \left([\text{Charge-e}]^2 \right) \cdot \left(1 - \left(\frac{1}{0.9926} \right) \right)}{4 \cdot \pi \cdot [\text{Permitivity-vacuum}] \cdot 3500\text{J/mol}}$$

31) Distance of Closest Approach using Electrostatic Potential

fx

Open Calculator 

$$r_0 = \frac{-(q^2) \cdot \left([\text{Charge-e}]^2 \right)}{4 \cdot \pi \cdot [\text{Permitivity-vacuum}] \cdot E_{\text{Pair}}}$$

ex

$$59.35292\text{A} = \frac{-\left((0.3\text{C})^2 \right) \cdot \left([\text{Charge-e}]^2 \right)}{4 \cdot \pi \cdot [\text{Permitivity-vacuum}] \cdot -3.5\text{E}^{-21}\text{J}}$$

32) Distance of Closest Approach using Madelung Energy

fx

Open Calculator 

$$r_0 = - \frac{M \cdot (q^2) \cdot \left([\text{Charge-e}]^2 \right)}{4 \cdot \pi \cdot [\text{Permitivity-vacuum}] \cdot E_{\text{M}}}$$

ex

$$59.85591\text{A} = - \frac{1.7 \cdot \left((0.3\text{C})^2 \right) \cdot \left([\text{Charge-e}]^2 \right)}{4 \cdot \pi \cdot [\text{Permitivity-vacuum}] \cdot -5.9\text{E}^{-21}\text{J}}$$



Madelung Constant 33) Madelung Constant given Repulsive Interaction Constant 

$$fx \quad M = \frac{B_M \cdot 4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot n_{\text{born}}}{(q^2) \cdot ([\text{Charge-e}]^2) \cdot (r_0^{n_{\text{born}}-1})}$$

Open Calculator 

$$ex \quad 1.702967 = \frac{4.1E^{-29} \cdot 4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot 0.9926}{((0.3C)^2) \cdot ([\text{Charge-e}]^2) \cdot ((60A)^{0.9926-1})}$$

34) Madelung Constant using Born Lande Equation 

$$fx \quad M = \frac{-U \cdot 4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot r_0}{\left(1 - \left(\frac{1}{n_{\text{born}}}\right)\right) \cdot ([\text{Charge-e}]^2) \cdot [\text{Avaga-no}] \cdot z^+ \cdot z^-}$$

Open Calculator 

$$ex \quad 1.688737 = \frac{-3500J/mol \cdot 4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot 60A}{\left(1 - \left(\frac{1}{0.9926}\right)\right) \cdot ([\text{Charge-e}]^2) \cdot [\text{Avaga-no}] \cdot 4C \cdot 3C}$$

35) Madelung Constant using Born-Mayer equation 

$$fx \quad M = \frac{-U \cdot 4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot r_0}{[\text{Avaga-no}] \cdot z^+ \cdot z^- \cdot ([\text{Charge-e}]^2) \cdot \left(1 - \left(\frac{\rho}{r_0}\right)\right)}$$

Open Calculator 

$$ex \quad 1.716794 = \frac{-3500J/mol \cdot 4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot 60A}{[\text{Avaga-no}] \cdot 4C \cdot 3C \cdot ([\text{Charge-e}]^2) \cdot \left(1 - \left(\frac{60.44A}{60A}\right)\right)}$$


36) Madelung Constant using Kapustinskii Approximation 

$$fx \quad M = 0.88 \cdot N_{\text{ions}}$$

Open Calculator 

$$ex \quad 1.76 = 0.88 \cdot 2$$




37) Madelung Constant using Madelung Energy 

$$fx \quad M = \frac{-(E_M) \cdot 4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot r_0}{(q^2) \cdot ([\text{Charge-e}]^2)}$$

Open Calculator 


$$ex \quad 1.704092 = \frac{-(-5.9E^{-21}J) \cdot 4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot 60A}{((0.3C)^2) \cdot ([\text{Charge-e}]^2)}$$

38) Madelung Constant using Total Energy of Ion 

$$fx \quad M = \frac{\left(E_{\text{tot}} - \left(\frac{B_M}{r_0^n \cdot \{\text{born}\}}\right)\right) \cdot 4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot r_0}{-(q^2) \cdot ([\text{Charge-e}]^2)}$$

Open Calculator 

$$ex \quad 1.695387 = \frac{\left(7.02E^{-23}J - \left(\frac{4.1E^{-29}}{(60A)^{0.9926}}\right)\right) \cdot 4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot 60A}{-((0.3C)^2) \cdot ([\text{Charge-e}]^2)}$$


39) Madelung Constant using Total Energy of Ion given Repulsive Interaction 

$$fx \quad M = \frac{(E_{\text{tot}} - E) \cdot 4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot r_0}{-(q^2) \cdot ([\text{Charge-e}]^2)}$$

Open Calculator 

$$ex \quad 1.692481 = \frac{(7.02E^{-23}J - 5.93E^{-21}J) \cdot 4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot 60A}{-((0.3C)^2) \cdot ([\text{Charge-e}]^2)}$$




40) Madelung Energy 

$$\text{fx } E_M = - \frac{M \cdot (q^2) \cdot ([\text{Charge-e}]^2)}{4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot r_0}$$

Open Calculator 

$$\text{ex } -5.9\text{E}^{-21}\text{J} = - \frac{1.7 \cdot ((0.3\text{C})^2) \cdot ([\text{Charge-e}]^2)}{4 \cdot \pi \cdot [\text{Permittivity-vacuum}] \cdot 60\text{A}}$$

41) Madelung Energy using Total Energy of Ion 

$$\text{fx } E_M = E_{\text{tot}} - E$$

Open Calculator 

$$\text{ex } -5.9\text{E}^{-21}\text{J} = 7.02\text{E}^{-23}\text{J} - 5.93\text{E}^{-21}\text{J}$$

42) Madelung Energy using Total Energy of Ion given Distance 

$$\text{fx } E_M = E_{\text{tot}} - \left(\frac{B_M}{r_0^n - \{\text{born}\}} \right)$$

Open Calculator 

$$\text{ex } -5.9\text{E}^{-21}\text{J} = 7.02\text{E}^{-23}\text{J} - \left(\frac{4.1\text{E}^{-29}}{(60\text{A})^{0.9926}} \right)$$










Variables Used

- **B** Repulsive Interaction Constant
- **B_M** Repulsive Interaction Constant given M
- **E** Repulsive Interaction between Ions (*Joule*)
- **E_M** Madelung Energy (*Joule*)
- **E_{min}** Minimum Potential Energy of Ion (*Joule*)
- **E_{Pair}** Electrostatic Potential Energy between Ion Pair (*Joule*)
- **E_R** Repulsive Interaction (*Joule*)
- **E_{tot}** Total energy of Ion in an Ionic Crystal (*Joule*)
- **E_{total}** Total Energy of Ion (*Joule*)
- **M** Madelung Constant
- **n_{born}** Born Exponent
- **N_{ions}** Number of Ions
- **p_{LE}** Pressure Lattice Energy (*Pascal*)
- **q** Charge (*Coulomb*)
- **r₀** Distance of Closest Approach (*Angstrom*)
- **R_a** Radius of Anion (*Angstrom*)
- **R_c** Radius of Cation (*Angstrom*)
- **r_{ionic}** Ionic Radius (*Angstrom*)
- **U** Lattice Energy (*Joule per Mole*)
- **U_{Kapustinskii}** Lattice Energy for Kapustinskii Equation (*Joule per Mole*)
- **V_{m_LE}** Molar Volume Lattice Energy (*Cubic Meter per Mole*)
- **z⁻** Charge of Anion (*Coulomb*)
- **z⁺** Charge of Cation (*Coulomb*)
- **ΔH** Lattice Enthalpy (*Joule per Mole*)
- **ρ** Constant Depending on Compressibility (*Angstrom*)
- **φ** Ionic Potential (*Volt*)



Constants, Functions, Measurements used

- **Constant:** **pi**, 3.14159265358979323846264338327950288
Archimedes' constant
- **Constant:** **[Avaga-no]**, 6.02214076E23
Avogadro's number
- **Constant:** **[Charge-e]**, 1.60217662E-19 Coulomb
Charge of electron
- **Constant:** **[Kapustinskii_C]**, 1.20200×10^{-4} Joule Meter / Mole
Kapustinskii constant
- **Constant:** **[Permittivity-vacuum]**, 8.85E-12 Farad / Meter
Permittivity of vacuum
- **Function:** **log10**, log₁₀(Number)
Common logarithm function (base 10)
- **Measurement:** **Length** in Angstrom (A)
Length Unit Conversion 
- **Measurement:** **Pressure** in Pascal (Pa)
Pressure Unit Conversion 
- **Measurement:** **Energy** in Joule (J)
Energy Unit Conversion 
- **Measurement:** **Electric Charge** in Coulomb (C)
Electric Charge Unit Conversion 
- **Measurement:** **Electric Potential** in Volt (V)
Electric Potential Unit Conversion 
- **Measurement:** **Molar Magnetic Susceptibility** in Cubic Meter per Mole (m³/mol)
Molar Magnetic Susceptibility Unit Conversion 
- **Measurement:** **Molar Enthalpy** in Joule per Mole (J/mol)
Molar Enthalpy Unit Conversion 



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