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Allred Rochow's Electronegativity Formulas

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List of 9 Allred Rochow's Electronegativity Formulas

Allred Rochow's Electronegativity

1) Allred Rochow's Electronegativity from Mulliken's Electronegativity

Open Calculator

fx $$X_{A.R} = (0.336 \cdot X_{M}) - 0.2 - 0.744$$

ex $$6.448\text{J} = (0.336 \cdot 22\text{J}) - 0.2 - 0.744$$

2) Allred Rochow's Electronegativity from Pauling's Electronegativity

Open Calculator

fx $$X_{A.R} = X_{P} - 0.744$$

ex $$6.496\text{J} = 7.24\text{J} - 0.744$$

3) Allred Rochow's Electronegativity given IE and EA

Open Calculator

fx $$X_{A.R} = ((0.336 \cdot 0.5) \cdot (\text{IE} + \text{E.A})) - 0.2 - 0.744$$

ex $$6.4984\text{J} = ((0.336 \cdot 0.5) \cdot (27.2\text{J} + 17.1\text{J})) - 0.2 - 0.744$$

4) Allred Rochow's Electronegativity of Element

Open Calculator

fx $$X_{A.R} = \frac{0.359 \cdot Z}{r_{covalent}^2}$$

ex $$6.445705\text{J} = \frac{0.359 \cdot 25}{(1.18\text{A})^2}$$

5) Allred Rochow's Electronegativity using Bond Energies

Open Calculator

fx $$X_{A.R} = \sqrt{E_{(A\text{-}B)} - \sqrt{E_{A\text{-}A} \cdot E_{B\text{-}B}}} - 0.744$$

ex $$6.483178\text{J} = \sqrt{75.47\text{J} - \sqrt{20\text{J} \cdot 27\text{J}}} - 0.744$$

6) Covalent Radius from Allred Rochow's Electronegativity

Open Calculator

fx $$r_{covalent} = \sqrt{\frac{0.359 \cdot Z}{X_{A.R}}}$$

ex $$1.175061\text{A} = \sqrt{\frac{0.359 \cdot 25}{6.5\text{J}}}$$

7) Effective Nuclear Charge from Allred Rochow's Electronegativity

Open Calculator

fx $$Z = \frac{X_{A.R} \cdot r_{covalent} \cdot r_{covalent}}{0.359}$$

ex $$25.21058 = \frac{6.5\text{J} \cdot 1.18\text{A} \cdot 1.18\text{A}}{0.359}$$

8) Electron Affinity of Element using Allred Rochow's Electronegativity

Open Calculator

$$E.A = \left((X_{A.R} + 0.744 + 0.2) \cdot \left(\frac{2}{0.336} \right) \right) - IE$$

ex $$17.10952J = \left((6.5J + 0.744 + 0.2) \cdot \left(\frac{2}{0.336} \right) \right) - 27.2J$$

9) Ionization Energy using Allred Rochow's Electronegativity

Open Calculator

$$IE = \left((X_{A.R} + 0.744 + 0.2) \cdot \left(\frac{2}{0.336} \right) \right) - E.A$$

ex $$27.20952J = \left((6.5J + 0.744 + 0.2) \cdot \left(\frac{2}{0.336} \right) \right) - 17.1J$$

Variables Used

- $E_{(A-B)}$ Actual Bond Energy given Electronegativity *(Joule)*
- E_{A-A} Bond Energy of A_2 Molecule *(Joule)*
- E_{B-B} Bond Energy of B_2 Molecule *(Joule)*
- $E.A$ Electron Affinity *(Joule)*
- IE Ionization Energy *(Joule)*
- $r_{covalent}$ Covalent Radius *(Angstrom)*
- $X_{A.R}$ Allred-Rochow's Electronegativity *(Joule)*
- X_M Mulliken's Electronegativity *(Joule)*
- X_P Pauling's Electronegativity *(Joule)*
- Z Effective Nuclear Charge

Constants, Functions, Measurements used

- Function: **sqrt**, sqrt(Number)
  Square root function
- Measurement: **Length** in Angstrom (A)
  Length Unit Conversion
- Measurement: **Energy** in Joule (J)
  Energy Unit Conversion

Check other formula lists

- **Allred Rochow's Electronegativity Formulas**
- **Mulliken's Electronegativity Formulas**
- **Pauling's Electronegativity Formulas**

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