What is Electronegativity?

Worksheet

Electronegativity is how strongly an atom attracts electrons in a bond, measured on the Pauling scale (0-4). Fluorine (4.0) is the most electronegative; cesium (0.7) is least. Electronegativity differences predict bond type: >2.0 = ionic, 0.5-2.0 = polar covalent, <0.5 = nonpolar covalent.

Pauling EN = (I.E. + E.A.) / 2 (conceptual)

Questions

1. Electronegativity measures

A) The energy to remove an electron from an atom
B) The ability to attract electrons in a bond
C) The number of valence electrons
D) The size of an atom

2. Bond in H-Cl: H = 2.1, Cl = 3.0. EN = ?

A) 0.0 (nonpolar)
B) 0.9 (polar covalent)
C) 2.1 (ionic)
D) 1.5 (polar covalent)

3. Which bond is most polar?

A) H-H (0.0)
B) C-C (0.0)
C) H-F (1.9)
D) C-H (0.4)

4. Electronegativity trend down a group

A) Increases (more attraction)
B) Decreases (less attraction)
C) Stays constant
D) Oscillates

5. Determine bond type in HF. Use Pauling electronegativities: H = 2.1, F = 4.0.

6. Classify the C-C bond in ethane (CH-CH). C = 2.6.

7. Classify the Na-Cl bond. Na = 0.9, Cl = 3.0.

8. Define: What is electronegativity?

9. Define: Which element is most electronegative?

10. Define: How does EN predict bond type?

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Answer Key

1. B) The ability to attract electrons in a bond - EN is the relative attraction for electrons in a chemical bond, not a property of isolated atoms.

2. B) 0.9 (polar covalent) - EN = |3.0 2.1| = 0.9, which is 0.5-2.0 range polar covalent bond.

3. C) H-F (1.9) - H-F has the largest EN (1.9) - strongest electron attraction by F most polar.

4. B) Decreases (less attraction) - Down a group, valence electrons are farther from nucleus weaker attraction in bonds lower EN.

5. EN = |4.0 2.1| = 1.9 Since 1.5 < EN < 2.0, HF is a POLAR COVALENT bond. F attracts the shared electron pair strongly bond is polarized (H is +, F is).

6. EN = |2.6 2.6| = 0 Since EN 0 (< 0.5), C-C is a NONPOLAR COVALENT bond. Electron density is equally shared - no polarity.

7. EN = |3.0 0.9| = 2.1 Since EN > 2.0, Na-Cl is an IONIC bond. Cl strongly attracts electron electron transfers from Na to Cl Na and Cl ions.

8. The relative ability of an atom to attract electrons in a chemical bond (Pauling scale: 0-4).

9. Fluorine (F = 4.0 on Pauling scale) - it attracts electrons most strongly in bonds.

10. EN > 2.0: ionic. 0.5-2.0: polar covalent. < 0.5: nonpolar covalent.

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