What is Bond Polarity and Electronegativity?

Worksheet

Bond polarity measures how unevenly electrons are shared in a bond. Electronegativity (Pauling scale, 0-4) quantifies an atom's electron-attracting power. Larger -electronegativity more polar bond.

Questions

1. Electronegativity measures an atom's ability to

A) lose electrons
B) attract electrons in a bond
C) share electrons equally
D) gain electrons in redox

2. The Pauling electronegativity scale ranges from

A) 0 to 2
B) 0 to 4
C) 1 to 10
D) 1 to +1

3. Which bond is most polar?

A) C-C
B) C-H
C) C-Cl
D) C-N

4. A bond with -electronegativity = 0 is

A) highly polar
B) nonpolar
C) ionic
D) metallic

5. Compare the polarity of H-H and H-Cl bonds.

6. Predict the bond polarity in C-O and C-N bonds.

7. Explain why HF is the most polar hydrogen halide.

8. Define: What is electronegativity?

9. Define: Electronegativity trend?

10. Define: Nonpolar bond definition?

Answer Key

1. B) attract electrons in a bond - Electronegativity = electron-attracting power in a covalent bond.

2. B) 0 to 4 - Pauling scale: F = 3.98 (highest), Cs = 0.79 (lowest); roughly 0-4 range.

3. C) C-Cl - C-Cl has 0.61; C-N has 0.49. Cl is more electronegative, making C-Cl more polar.

4. B) nonpolar - = 0 means equal sharing of electrons nonpolar (covalent).

5. H-H: both atoms have electronegativity 2.1 = 0 nonpolar bond H-Cl: H = 2.1, Cl = 3.16 = 1.06 polar bond (Cl pulls electrons, forms charge) Conclusion: H-H is nonpolar; H-Cl is polar

6. C-O: C = 2.55, O = 3.44 = 0.89 moderately polar (O is more electronegative) C-N: C = 2.55, N = 3.04 = 0.49 weakly polar (N is more electronegative) Conclusion: C-O is more polar than C-N due to larger -electronegativity

7. H = 2.1, F = 3.98 = 1.88 (largest among H-X) Comparison: H-F (1.88) > H-Cl (1.06) > H-Br (0.76) > H-I (0.46) F's high electronegativity creates the largest electron shift most polar bond

8. An atom's ability to attract electrons in a chemical bond (measured on Pauling scale, 0-4).

9. Increases left-to-right across a period; increases bottom-to-top up a group. F is highest (3.98), Cs is lowest (0.79).

10. A bond between atoms with equal or nearly equal electronegativity (0), so electrons are shared equally.