What Is Electronegativity and How Does It Affect Bond Polarity?

Worksheet

Electronegativity measures how strongly an atom pulls on shared electrons. Higher electronegativity difference between bonded atoms more polar the bond. Bond polarity determines how the electron density is distributed.

Questions

1. Electronegativity increases as you move

A) down and left in the periodic table
B) up and right in the periodic table
C) down and right
D) in no consistent direction

2. Which pair has the largest electronegativity difference?

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

3. Why is F-F nonpolar despite F being highly electronegative?

A) F is not actually electronegative
B) both F atoms pull equally on the shared pair
C) F atoms repel
D) there is no bond

4. In the H-Cl bond, which atom is partially negative?

A) H, because it is smaller
B) Cl, because it is more electronegative
C) both equally
D) neither

5. Compare electronegativity of C, N, and O. Which is highest?

6. How does electronegativity affect the H-F bond?

7. Why is F more electronegative than Cl even though Cl is larger?

8. Define: What is electronegativity?

9. Define: Which element is most electronegative?

10. Define: Where do electronegative elements sit in the periodic table?

Answer Key

1. B) up and right in the periodic table - Increasing nuclear charge + decreased shielding = stronger electron pull.

2. C) C-O - C (2.5) and O (3.5): EN = 1.0, largest of the given pairs.

3. B) both F atoms pull equally on the shared pair - Identical atoms equal pull symmetric nonpolar.

4. B) Cl, because it is more electronegative - Cl (3.0) > H (2.1) Cl pulls electrons Cl is .

5. C: 2.5, N: 3.0, O: 3.5 O > N > C Oxygen has highest electronegativity. Reason: rightward and upward in periodic table more electronegative.

6. H: 2.1, F: 3.98 EN = 1.88 Very large difference highly polar bond. Electrons pulled strongly toward F F is , H is .

7. F is in period 2, Cl in period 3. F has higher nuclear charge relative to electron shielding. Smaller atomic radius + higher Z electrons closer to nucleus stronger pull. F (3.98) > Cl (3.0).

8. An atom's ability to attract electrons in a covalent bond (measured on Pauling scale, 0.7-3.98).

9. Fluorine (F), with a value of 3.98 on the Pauling scale.

10. Upper right: groups 16-17, periods 1-3. F, O, N, Cl are all highly electronegative.