

What Is the Difference Between Polar and Nonpolar Bonds?

Worksheet

Nonpolar bonds share electrons equally (e.g., H-H, Cl-Cl). Polar bonds have unequal sharing (e.g., H-Cl, O-H) because one atom is more electronegative and pulls electron density toward itself.

Questions

1. The H-H bond is

- A) polar because H is highly electronegative
- B) nonpolar because both atoms are identical
- C) polar because atoms share electrons
- D) always breaks in water

2. Which bond is most polar?

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

3. In a polar covalent bond, the more electronegative atom is

- A) (partially positive)
- B) (partially negative)
- C) neutral
- D) positive

4. Electronegativity difference > 1.7 suggests

- A) nonpolar covalent bond
- B) polar covalent bond
- C) ionic bond
- D) no bond

5. Is the H-H bond polar or nonpolar? Explain.

6. Is the H-Cl bond polar or nonpolar? Calculate EN.

7. Would C-C or C-O be more polar?

8. Define: Nonpolar covalent bond?

9. Define: Polar covalent bond?

10. Define: What causes bond polarity?

Answer Key

1. B) nonpolar because both atoms are identical - Identical atoms zero electronegativity difference nonpolar.
2. C) C-O - O (3.5) vs C (2.5): EN = 1.0. Largest difference here.
3. B) (partially negative) - Pulls electrons closer becomes electron-rich .
4. C) ionic bond - Large EN essentially ionic (electron transferred, not shared).
5. Both atoms are hydrogen (identical). Electronegativity: H = 2.1, so EN = 0. Electrons shared equally nonpolar bond.
6. H: 2.1, Cl: 3.0 EN = 3.0 - 2.1 = 0.9 EN > 0.5 polar covalent bond. Cl pulls electrons on Cl, on H.
7. C-C: EN = 0 (identical atoms) nonpolar. C-O: C = 2.5, O = 3.5 EN = 1.0 polar. C-O is more polar because oxygen is much more electronegative.
8. Equal electron sharing; EN 0 (e.g., H-H, Cl-Cl).
9. Unequal electron sharing; EN > 0.4 (e.g., H-Cl, C-O).
10. Difference in electronegativity - more electronegative atom pulls electrons closer.

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