What Are Lewis Dot Structures?

Worksheet

A Lewis dot structure shows the valence electrons of an atom (or molecule) as dots around the atom's symbol, helping predict how atoms bond. For molecules, dots become lines (bonds) between atoms, and lone pairs remain as dots.

Questions

1. In Lewis dot notation, two paired dots (or a line) represent

A) two separate electrons
B) a bond (two electrons shared)
C) an atom
D) no electrons

2. How many valence electrons does nitrogen have in its Lewis structure?

A) 3
B) 5
C) 7
D) 8

3. In a Lewis structure, what does a lone pair look like?

A) a single dot
B) two paired dots or a colon
C) a line
D) no representation

4. Why must hydrogen satisfy 2 electrons, not 8?

A) H is small
B) H's only shell is n=1, which holds max 2
C) H is special
D) H doesn't follow the octet rule

5. Draw the Lewis dot structure for CH (methane).

6. Draw the Lewis structure for HCl.

7. Draw the Lewis structure for CO. Does it have lone pairs?

8. Define: What does a dot represent in a Lewis structure?

9. Define: What is the octet rule?

10. Define: Why does H only have 2 electrons?

Answer Key

1. B) a bond (two electrons shared) - A pair of electrons = a covalent bond.

2. B) 5 - Nitrogen is in group 15 5 valence electrons.

3. B) two paired dots or a colon - Two paired electrons (not in a bond) are shown as :: or two dots together.

4. B) H's only shell is n=1, which holds max 2 - The first shell (K shell) has capacity only 2.

5. Valence electrons: C = 4, H = 1 4 = 4, total = 8. Carbon is central (less electronegative, and H must be outer). Connect C-H with 4 single bonds (8 electrons used). All atoms satisfy octet (H needs 2, C needs 8). Final: no lone pairs; all electrons in bonds.

6. Valence electrons: H = 1, Cl = 7, total = 8. H is terminal, Cl is central. Draw one H-Cl single bond (2 electrons). Remaining 6 electrons: 3 lone pairs on Cl. H has 2 (satisfied); Cl has 8 (octet satisfied).

7. Valence electrons: C = 4, O = 6 2 = 12, total = 16. Carbon is central, oxygens are outer. Draw C=O double bonds (4 electrons each, 8 total). Remaining 8 electrons: 2 lone pairs on each O. Carbon has 8, each O has 8. No lone pairs on C.

8. A valence electron. Two dots together (or a line) represent a pair of electrons (a bond).

9. Atoms tend to have 8 valence electrons around them (except H, which needs 2).

10. Hydrogen's only valence shell is the first shell (n=1), which holds max 2 electrons.