Experiment 13: Molecular Model Building

Section

Lab Partner

Key

1. Label the atoms with their element(s) and indicate the species (e.g., H₂, H₂O, CO₂).

2. Determine if the molecule is polar or nonpolar. A molecule is polar if the atoms are different. The two bond dipoles will cancel if the two atoms are the same, resulting in a nonpolar molecule.

3. Draw the molecular structure and label the polarity of the molecule.

4. For each molecule, write the dot structure, draw the Lewis dot structure, and determine the molecular shape and polarity of the molecule.

5. For each of the following, write the dot structure, Lewis dot structure, and determine the molecular shape and polarity of the molecule.

- C-O-C
- N≡N
- H-Br
- H₂O
- H₂CO
The diagram shows molecular structures and their shapes. The molecules include:

- CH₄ (molecular geometry: tetrahedral, 4 groups around central atom)
- H₂ - CH₂ - H (molecular geometry: linear, 2 atoms)
- H₂ - CH₃ (molecular geometry: trigonal planar, 3 atoms)
- H₂ - CH₄ (molecular geometry: tetrahedral, 4 atoms)
- H₂ - H₂ (molecular geometry: linear, 2 atoms)
- H₂ - S = H (molecular geometry: linear, 2 atoms)

The polar and non-polar characteristics of these molecules are also indicated:

- Polar molecules:
  - CH₄
- Non-polar molecules:
  - H₂ - CH₂ - H
  - H₂ - CH₃
  - H₂ - CH₄
  - H₂ - H₂
  - H₂ - S = H
Lewis Dot Structure

- **H₂O**: $O$: $\cdot$ $H$ $\cdot$ $H$
- **SO₂**: $S$: $\cdot$ $O$ $\cdot$ $O$ $\cdot$ $C$
- **CH₄**: $C$: $\cdot$ $H$ $\cdot$ $H$ $\cdot$ $H$ $\cdot$ $H$

# of Groups and Electron Geometry

- **H₂O**: 2 groups, trigonal planar, bent
- **SO₂**: 2 groups, bent
- **CH₄**: 4 groups, tetrahedral, trigonal planar

Molecular Shape

- **H₂O**: tetrahedral
- **SO₂**: tetrahedral
- **CH₄**: trigonal planar

Polarity

- **H₂O**: polar
- **SO₂**: not polar
- **CH₄**: non-polar