

AP Chemistry
Covalent Molecular Properties

II. What are the properties of a covalent bond?

- Student will be able to indicate the difference between Intermolecular forces and intermolecular forces.
- Students will be able to indicate provide and describe the intermolecular forces of Hydrogen bonding and London Forces.
- Student should be able to use the concepts of electronegativity and molecular structure to determine if a covalent molecule has a dipole moment.
- Student should be able to use a molecules dipole moment to determine compounds solubility.

$Nl_{3(s)}$ $CO_{2(g)}$ $H_2O(l)$ $H_2(g)$ $He(g)$ $XeF_6(g)$ $C_6H_{14(l)}$ $BF_3(g)$ $NH_4^+(aq)$ $C_{(diamond)}$ $Ne(g)$
 (to answer the questions below you may need to write out a Lewis structure)

1. Ne has a slightly higher boiling point than H_2 . Justify?

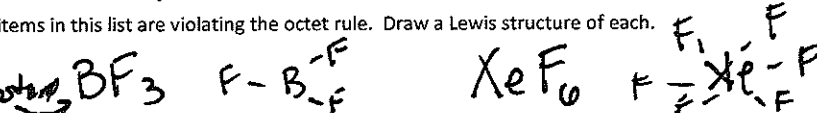
increased LdF, more e^- , more polarizable

2. This substance has polar bonds but is itself not polar. What substance and why?

CO_2 , symmetrical, cancels dipoles

3. Two items in this list are violating the octet rule. Draw a Lewis structure of each.

This is just a unique substance



4. CO_2 has more London forces than H_2O yet H_2O is a liquid at room temperature and CO_2 is a gas. Why?

$H_2O \rightarrow$ Hydrogen Bonds, CO_2 only LdF

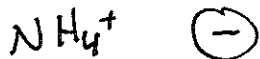
5. Nl_3 is a solid at room temperature. Draw a Lewis structure and give a reason why it would be solid.

asymmetrical, dipole-dipole attractions

6. C_6H_{14} is an organic hydrocarbon that is liquid at room temperature. Draw a hydrocarbon that would be gaseous at room temperature.

- shorten the chain $-C-C-$ Less LdF

7. Which substance must have an anion associated with it.



8. Which substance has the highest melting point?

Network Covalent? Carbon diamond

9. What is the hybridization of XeF_6 .



10. Which substance is London Forces a major force in its state of matter?

$C_6H_{14}(l)$ ← Reason for liquid?

11. This substance has a dipole moment of zero.

$CO_2 + H_2 + C_{diamond}, XeF_6, BF_3$

12. $Nl_{3(s)}$ will decompose to $N_{2(g)}$ and $I_{2(g)}$.

- Write a balanced equation of this process.
- Draw a before and after picture of the reaction including materials enough for 1 cycle of the reaction.

