Unit #1: Matter and Bonding

Part A: Lewis Dot Diagrams

- Draw the symbol of the element
- Draw dots around the symbol to represent the valence (outer orbit) electrons (one dot on each of the four sides, then start to pair up the dots). Remember the pattern for the number of valence electrons as you move across the columns in the periodic table: 1, 2, 3, 4, 5, 6, 7, 8 (2)

Element	Lewis dot diagram of atom	Lewis dot diagram of stable ion
Sodium	Na·	$[Na]^+$
Sulfur	·S:	$[:S:]^{2-}$
Neon	:Ne:	no ion

Part B: Covalent and Ionic Bonding

3.3 ⟷ 1.7 ⟷ 0.4 ⟷ 0

ionic | polar covalent | slightly polar covalent | pure (non-polar) covalent

Example: What type of bonding would be found between the following atoms?

a) Ca and Cl

$\Delta EN = 3.16 - 1.00$

$= 2.16$ ionic

b) C and H

$\Delta EN = 2.55 - 2.20$

$= 0.35$

slightly polar covalent

Part C: Lewis Structures for Ionic Compounds

Write the chemical formula and name of the resulting ionic compound. Draw its Lewis Structure.

a) Aluminum and fluorine

Al^{3+} F^{1-} AlF_3

aluminum fluoride

$[Al]^{3+}\ 3\,[:\ddot{F}:]^-$

b) Barium and oxygen

BaO barium oxide

$[Ba]^{2+}\ [:\ddot{O}:]^{2-}$

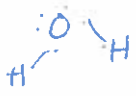
Part D: Lewis Structures for Covalent Compounds

DDF H–Br

Draw the Lewis Structure for the following, with shape, indicate if the bonds are polar, molecule is polar. Identify the intermolecular forces present.

eg. H_2O

Rough

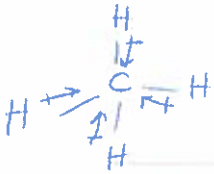


bonds are polar

molecule is polar

HB, LDF

CH_4

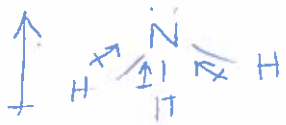


bonds are slightly polar

molecule is nonpolar

LDF

NH_3



bonds are polar

molecule is polar

HB, LDF

O_2

bonds are nonpolar

molecule is nonpolar

LDF