

# F. Electron Dot Structures and Molecular Shape

What is the difference between polar and nonpolar?

Formula	1. Electron dot Structure	2. Total number of electron groups	3. Electron geometry	4. Bond angle	5. Number of bonded atoms	6. Molecular geometry	7. Polar or nonpolar?
H <sub>2</sub> O	H:O: - good job! " "	2	tetrahedral	105	2	bent	polar
SBr <sub>2</sub>	Br:S:Br:	4	tetrahedral	105	3	bent	polar
NO <sub>2</sub>	..Cl: :Cl:N:Cl: ..Cl:	4	tetrahedral	107.5	4	trigonal pyramid	polar
CCl <sub>4</sub>	..Br: ..Cl:Br: ..Br:	4	tetrahedral	109	5	tetrahedral	non polar
SO <sub>2</sub>	:O: :O:S:O:	3	trigonal polar	170	4	trigonal plane	polar
CO <sub>2</sub>	:O:C:O:	2	linear	180	3	linear	polar
NO <sub>3</sub>	O:N:O: :O:	4	tetrahedral	107.5	4	trigonal pyramid	polar
CHCl <sub>3</sub>	Cl H:C:Cl Cl	4	tetrahedral	109	5	tetrahedral	non polar

### E.2 Physical properties

Compound	Appearance	Density	Melting Point

### E.3 Electron-dot structures

Compound	Electron-Dot Structure	Name
H <sub>2</sub> O	$  \begin{array}{c}  \cdot\cdot \\  \text{H} : \text{O} : \\  \cdot\cdot \\  \text{H}  \end{array}  $	<u>di</u> -hydrogen <u>oxide</u>
SBr <sub>2</sub>	$  \begin{array}{c}  \cdot\cdot \\  \text{Br} : \text{S} : \text{Br} \\  \cdot\cdot  \end{array}  $	Sulfur bromide
PCl <sub>3</sub>	$  \begin{array}{c}  \cdot\cdot \quad \cdot\cdot \\  : \text{Cl} : \text{P} : \text{Cl} : \\  \cdot\cdot \quad \cdot\cdot \\  : \text{Cl} : \\  \cdot\cdot  \end{array}  $	phosphorus <u>tri</u> -chloride
CBr <sub>4</sub>	$  \begin{array}{c}  \cdot\cdot \\  \text{Br} \\  \cdot\cdot \\  \text{Br} : \text{C} : \text{Br} : \\  \cdot\cdot \\  \text{Br} \\  \cdot\cdot  \end{array}  $	Carbon <u>tetra</u> bromide
SO <sub>3</sub>	$  \begin{array}{c}  \cdot\cdot \\  \text{O} \\  \cdot\cdot \\  \text{O} : \text{S} : \text{O} \\  \cdot\cdot \\  \cdot\cdot  \end{array}  $	Sulfur <u>tri</u> oxide   why are prefixes used?

good job!

## D.2 Formulas of ionic compounds

Good job!, but your work is not very clear, try to write clearer please.

Name	Positive Ion	Negative Ion	Formula
Potassium carbonate	$K^+$	$CO_3^{2-}$	$K_2CO_3$
Sodium nitrate	$Na^+$	$NO_3^-$	$NaNO_3$
Calcium bicarbonate	$Ca^{2+}$	$HCO_3^-$	$Ca(HCO_3)_2$
Aluminium hydroxide	$Al^{3+}$	$OH^-$	$Al(OH)_3$
Lithium phosphate	$Li^+$	$PO_4^{3-}$	$Li_3PO_4$
Potassium sulfate	$K^+$	$SO_4^{2-}$	$K_2SO_4$

## D.3 Names of ionic compounds

$CaSO_4$	Calcium sulfate
$Al(NO_3)_3$	Aluminium Nitrate
$Na_2CO_3$	Sodium carbonate
$MgSO_3$	Magnesium sulfite
$Cu(OH)_2$	Copper hydroxide
$Mg_3(PO_4)_2$	Magnesium phosphate

↓  
Why do some formulas have parentheses?

### 2.3 Names of ionic compounds

$\text{Cu}_2\text{S}$	Copper(I) sulfide
$\text{Fe}_2\text{O}_3$	Iron(III) oxide
$\text{CuCl}_2$	Copper(II) chloride
$\text{FeS}$	Iron Sulfide
$\text{Ag}_2\text{O}$	Silver Oxide
$\text{FeBr}_2$	Iron(II) Bromide

↓  
maybe you can explain  
why roman numerals are used  
to name some ionic compounds?

good job!  
show side notes of  
your work

### B.2 Formulas of ionic compounds

Name	Positive Ion <sup>cation</sup>	Negative Ion <sup>anion</sup>	Formula
Sodium chloride	Na <sup>+</sup>	Cl <sup>-</sup>	NaCl
Magnesium chloride	Mg <sup>2+</sup>	Cl <sup>-</sup>	MgCl <sub>2</sub>
Calcium oxide	Ca <sup>2+</sup>	O <sup>2-</sup>	CaO
<sup>+1</sup> Lithium <sup>-3</sup> phosphide	Li <sup>+</sup>	P <sup>3-</sup>	Li <sub>3</sub> P
<sup>+3</sup> Aluminum <sup>-2</sup> sulfide	Al <sup>3+</sup>	S <sup>2-</sup>	Al <sub>2</sub> S <sub>3</sub>
<sup>+2</sup> Calcium <sup>-3</sup> nitride	Ca <sup>2+</sup>	N <sup>3-</sup>	Ca <sub>3</sub> N <sub>2</sub>

### B.3 Names of ionic compounds

Electron-Dot Structure	Loss or Gain of Electrons	Electron Arrangement of Ion	Ionic Charge	Symbol of Ion	Name of Ion
Na <sup>•</sup>	lose 1e <sup>-</sup>	2-8	1+	Na <sup>+</sup>	sodium ion
•N• •	gain 3e <sup>-</sup>	2-8 <sup>-</sup>	3-	N <sup>3-</sup>	nitride ion
Al <sup>•</sup>	lose 3e <sup>-</sup>	2-8	3+	Al <sup>3+</sup>	aluminium ion
•Cl: •	gain 1e <sup>-</sup>	2-8-8	1-	Cl <sup>-</sup>	chloride ion
Ca <sup>•</sup>	lose 2e <sup>-</sup>	2-8-8	2+	Ca <sup>2+</sup>	Calcium ion
•O: •	gain 2e <sup>-</sup>	2-8	2-	O <sup>2-</sup>	oxide ion

good job! you are clearly showing the steps of how ions are formed!

Date 11/3/14  
Section \_\_\_\_\_  
Instructor \_\_\_\_\_

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**Pre-Lab Study Questions**

1. Where are the valence electrons in an atom?

In the outermost shell. — try to explain more about why they are placed in the outermost shell and what they are used for.

2. How are positive and negative ions formed?

They are formed when an atom takes an electron from another atom. The atom with less electron is the positive ion, the electron with more electrons are negative ions?

3. How do subscripts represent the charge balance of ions?

The subscripts represents how much of each element is required to balance the charge of the atom out.

4. Why are electrons shared in covalent compounds?

Electrons are shared in covalent compounds because the electronegativity...

in what type of bond are ions formed?

please finish the answer

edited by Aamna

Scanned by CamScanner