

Chemistry Test 3 Study Guide (Chapters 7-9)

Chapter 7

What is a cation? What is an anion? (p. 207-209)

What is an ionic bond? (p. 210)

Does it share or transfer electrons?

Is it between two metals, two nonmetals, or a metal and a nonmetal?

How do I form an ionic compound so that the charges are equal?

Ex. If potassium and oxygen joined to form an ionic compound, potassium is a +1 charge and oxygen is -2. You would need 2 potassium to balance out the charge of one oxygen, so the formula would be K_2O .

Review chart for common polyatomic ions and their charges. You will have this to use on the test.

Table 9 Common Polyatomic Ions			
Ion	Name	Ion	Name
NH_4^+	ammonium	IO_4^-	periodate
NO_2^-	nitrite	$C_2H_3O_2^-$	acetate
NO_3^-	nitrate	$H_2PO_4^-$	dihydrogen phosphate
OH^-	hydroxide	CO_3^{2-}	carbonate
CN^-	cyanide	SO_3^{2-}	sulfite
MnO_4^-	permanganate	SO_4^{2-}	sulfate
HCO_3^-	hydrogen carbonate	$S_2O_3^{2-}$	thiosulfate
ClO^-	hypochlorite	O_2^{2-}	peroxide
ClO_2^-	chlorite	CrO_4^{2-}	chromate
ClO_3^-	chlorate	$Cr_2O_7^{2-}$	dichromate
ClO_4^-	perchlorate	HPO_4^{2-}	hydrogen phosphate
BrO_3^-	bromate	PO_4^{3-}	phosphate
IO_3^-	iodate	AsO_4^{3-}	arsenate

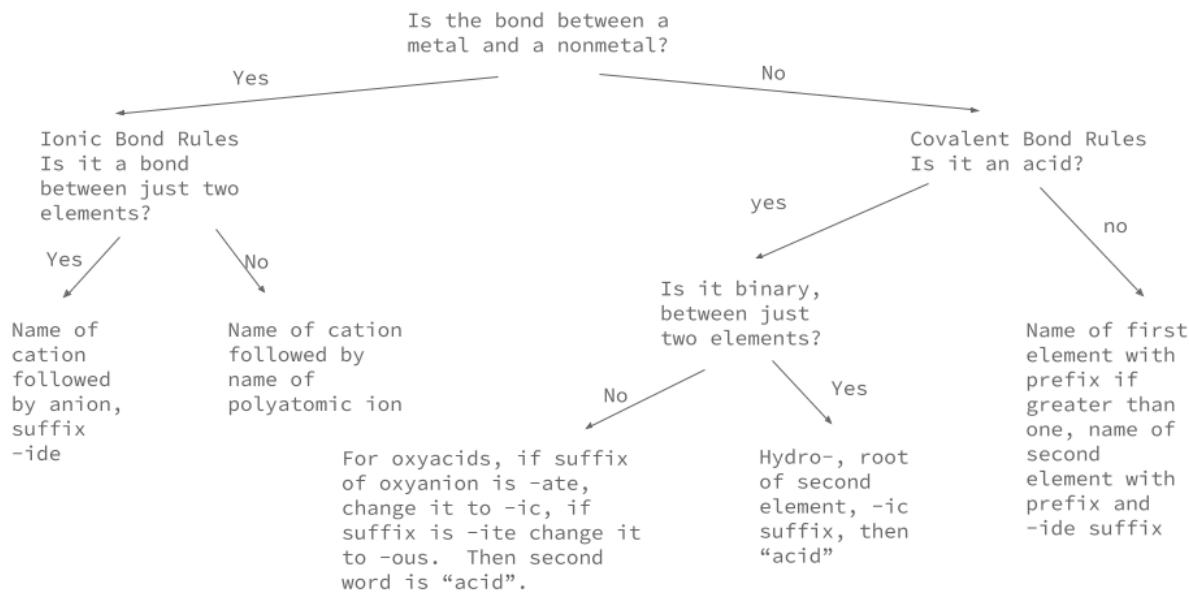
What are metallic bonds? (p. 225)

What is the electron sea model? (p. 225)

What is a covalent bond? (p. 241)
 Does it share or transfer electrons?
 Is it between two nonmetals, two metals, or a metal and nonmetal?

How do I decide how to name a compound?
 (flow chart below)

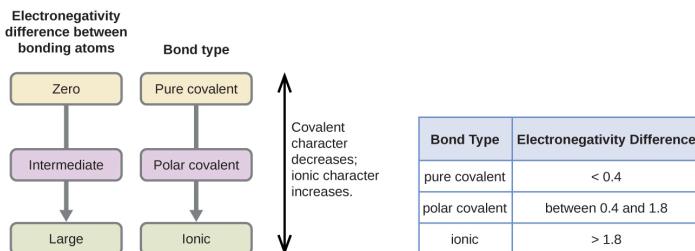
NAMING COMPOUNDS FLOWCHART



Practice Naming these using the chart above: NaCl, NaNO₂, NO₂, HCl, H₂SO₃

How do I draw a Lewis structure for covalent compounds? (p. 254)

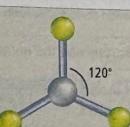
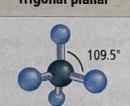
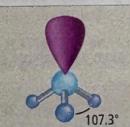
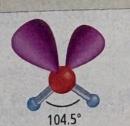
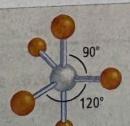
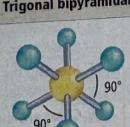
How do I tell if a covalent compound is polar or nonpolar? (p. 266-268)



What are the three types of intermolecular forces that happen between molecules? (p. 269)

If I am given this chart, and the Lewis structure of a compound, be able to tell what the molecular shape will be. Look at “shared pairs” and “lone pairs” to help.

Table 6 Molecular Shapes

Molecule	Total Pairs	Shared Pairs	Lone Pairs	Hybrid Orbitals	Molecular Shape*
BeCl_2	2	2	0	sp	 Linear 180°
AlCl_3	3	3	0	sp^2	 Trigonal planar 120°
CH_4	4	4	0	sp^3	 Tetrahedral 109.5°
NH_3	4	3	1	sp^3	 Trigonal pyramidal 107.3°
H_2O	4	2	2	sp^3	 Bent 104.5°
NbBr_5	5	5	0	sp^3d	 Trigonal bipyramidal 90° 120°
SF_6	6	6	0	sp^3d^2	 Octahedral 90° 90° 90°

The BeCl₂ molecule contains only two pairs of electrons shared with the central Be atom. These bonding electrons have the maximum separation, a bond angle of 180°, and the molecular shape is linear.

The three bonding electron pairs in AlCl₃ have maximum separation in a trigonal planar shape with 120° bond angles.

When the central atom in a molecule has four pairs of bonding electrons, as CH₄ does, the shape is tetrahedral. The bond angles are 109.5°.

NH₃ has three single covalent bonds and one lone pair. The lone pair takes up a greater amount of space than the shared pairs. There is stronger repulsion between the lone pair and the bonding pairs than between two bonding pairs. The resulting geometry is trigonal pyramidal, with 107.3° bond angles.

Water has two covalent bonds and two lone pairs. Repulsion between the lone pairs causes the angle to be 104.5°, less than both tetrahedral and trigonal pyramidal. As a result, water molecules have a bent shape.

The NbBr₅ molecule has five pairs of bonding electrons. The trigonal bipyramidal shape minimizes the repulsion of these shared electron pairs.

As with NbBr₅, SF₆ has no unshared electron pairs on the central atom. However, six shared pairs arranged about the central atom result in an octahedral shape.

Be able to write and balance a chemical equation. (p. 286)
(You can practice this on what's left on your practice sheets).

What are 5 types of reactions?

Types of Chemical Reactions

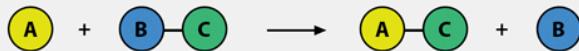
1. Combination or Synthesis Reaction



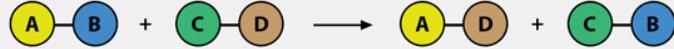
2. Decomposition Reaction



3. Single-replacement Reaction



4. Double-replacement Reaction



5. Combustion Reaction

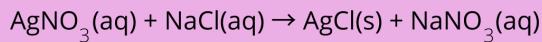


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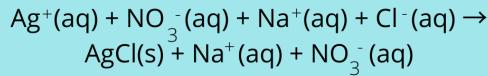
How do I identify the difference in complete and net ionic equations for reactions in aqueous solutions?

Net Ionic Equation and Complete Ionic Equation

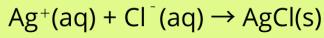
Molecular Equation or Balanced Equation



Complete Ionic Equation



Net Ionic Equation



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