

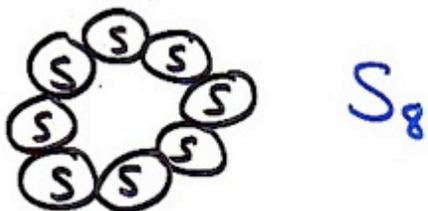
Polyatomic molecules

- Many atoms (> 2)

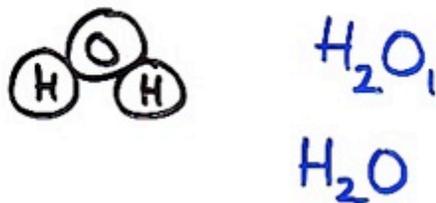
ex: Ozone



Sulfur



Water



Ions = Atom or molecule that's gained/lost e^-

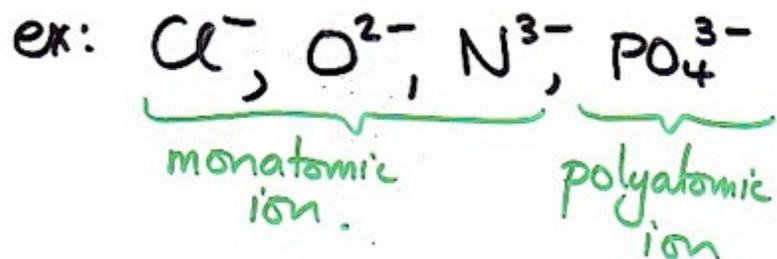
Atoms } electrically
Molecules } neutral.

ex: Carbon-12 $\xrightarrow{\text{mass \# (A)}}$ \uparrow $\#p^+ = \#n^0$ $\left[\begin{array}{c} 6 \\ C \end{array} \right]$
 $6p^+$
 $6n^0$ $\rightarrow 6e^-$ to cancel out charge!

All atoms: $\#p^+ = \#e^-$ (NEUTRAL)
polyatomic ion.

ex: Na^+ , H^+ , NH_4^+ , Ca^{2+}
lost e^- : formed a +ve ion
CATION
|
monatomic ions

If atoms/molecules gain e⁻
they form -ve ions (ANIONS)

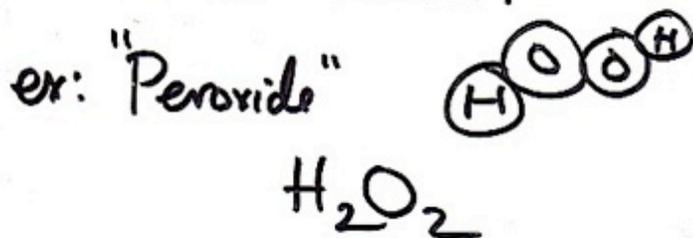


Cation Anion

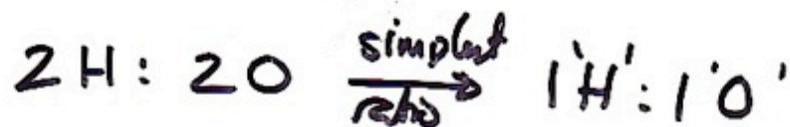
Chemical Formulas

Molecular Formulas.

- tell us about actual # atoms
in the molecule.



Empirical Formulas (\$100)
- simplest whole # ratios.

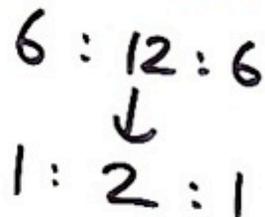


Empirical formula = HO

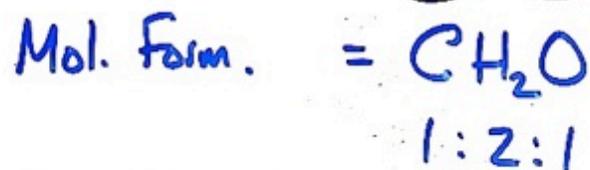
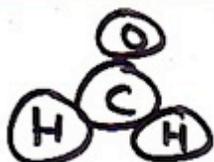
ex: GLUCOSE

Molecular formula: $\text{C}_6\text{H}_{12}\text{O}_6$

Empirical formula: CH_2O



Formaldehyde:



Formulas of Ionic Compounds

Ionic cpds: Cations + Anions
 \oplus \ominus

Golden rule: as many \oplus as \ominus .

ex: Common Salt:

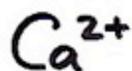
contains Na^+ and Cl^-

need 1 Na^+ : 1 Cl^-

Formula: $\boxed{\text{NaCl}}$ — no longer write charges!

Calcium Chloride

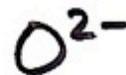
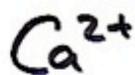
Sno-melt



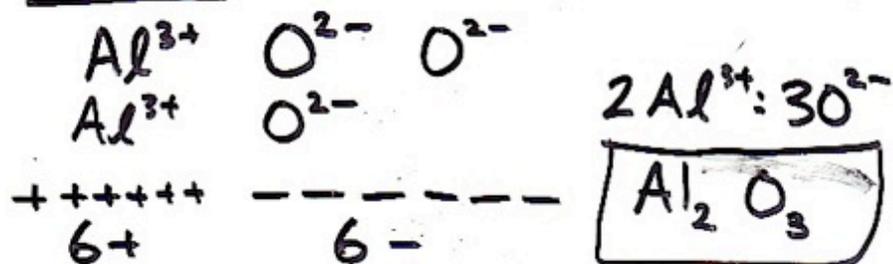
— no charges!

Calcium oxide

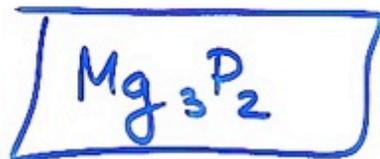
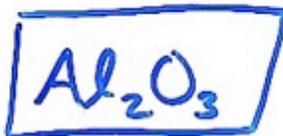
Lime



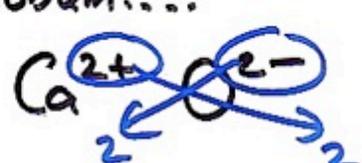
Alumina



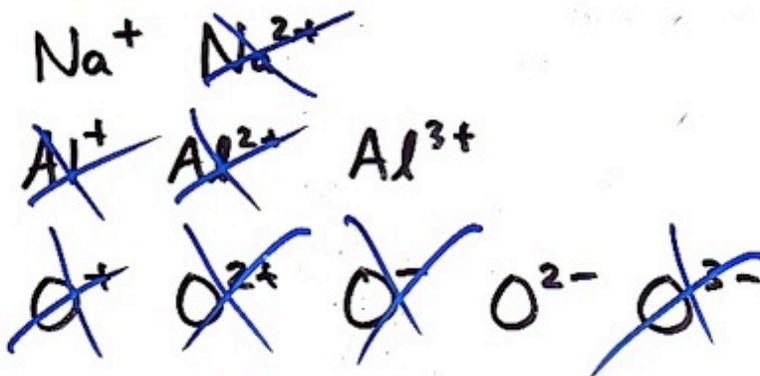
easier ways... (swap-down method)



Problem....



simplify subscripts
2:2 → 1:1



Pattern to charges...

IA	IIA	IIIA	IVA	VIA	VIIA
H^+			Non-Metals		
Li^+			N^{3-}	O^{2-}	F^-
Na^+	Mg^{2+}	Al^{3+}	P^{3-}	S^{2-}	Cl^-
K^+	Ca^{2+}		As^{3-}	Se^{2-}	Br^-
	Sr^{2+}				I^-

Metals
CATIONS

ANIONS

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1 1A	2 2A											13 3A	14 4A	15 5A	16 6A	17 7A	18 8A
Li ⁺													C ⁴⁺	N ³⁻	O ²⁻	F ⁻	
Na ⁺	Mg ²⁺	3 3B	4 4B	5 5B	6 6B	7 7B	8 8B		9	10	11 1B	12 2B	Al ³⁺		P ³⁻	S ²⁻	Cl ⁻
K ⁺	Ca ²⁺				Cr ²⁺ Cr ³⁺	Mn ²⁺ Mn ³⁺	Fe ²⁺ Fe ³⁺	Co ²⁺ Co ³⁺	Ni ²⁺ Ni ³⁺	Cu ⁺ Cu ²⁺	Zn ²⁺				Se ²⁻	Br ⁻	
Rb ⁺	Sr ²⁺									Ag ⁺	Cd ²⁺		Sn ²⁺ Sn ⁴⁺		Te ²⁻	I ⁻	
Cs ⁺	Ba ²⁺									Au ⁺ Au ³⁺	Hg ₂ ²⁺ Hg ²⁺		Pb ²⁺ Pb ⁴⁺				

Since metals make CATIONS (+)
and non-metals make ANIONS (-)
then "most" ionic compounds will
be formed from metals + non-metals.

ex: NaCl, CaBr₂, Al₂O₃

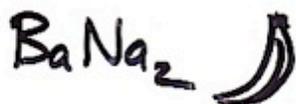
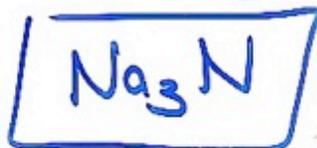
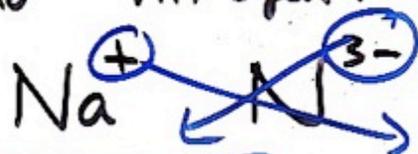
ZnS, FeCl₃

Tricky

Transition metal ions...
have many different possible
charges!

ex: Fe²⁺, Fe³⁺ Cu⁺, Cu²⁺

ex: Predict the formula of the ionic cpd made from sodium and nitrogen?



Go Home!