

Key

Ionic Bonding Practice #1

All end in -ide

Simple Ionic Bonds Containing Main Group Metals:

Cation	Anion	Ion Ratio	Formula	Name
Na ⁺¹	Cl ⁻¹	1:1	NaCl	sodium chloride
K ⁺¹	Se ⁻²	2:1	K ₂ Se	potassium selenide
Ca ⁺²	Br ⁻¹	1:2	CaBr ₂	calcium bromide
Mg ⁺²	S ⁻²	2:2 → 1:1	MgS	magnesium sulfide
Ba ⁺²	N ⁻³	3:2	Ba ₃ N ₂	barium nitride
Ag ⁺¹	O ⁻²	2:1	Ag ₂ O	silver oxide
Zn ⁺²	P ⁻³	3:2	Zn ₃ P ₂	zinc phosphide
Al ⁺³	F ⁻¹	1:3	AlF ₃	aluminum fluoride

Swap charges to get ratio.
Reduce if possible

Simple Ionic Bonds Containing Transition Metals:

Cation	Anion	Ion Ratio	Formula	Name
Fe ⁺²	F ⁻¹	1:2	FeF ₂	iron II fluoride
Sn ⁺⁴	S ⁻²	2:4 → 1:2	SnS ₂	tin IV sulfide
Pb ⁺²	Cl ⁻¹	1:2	PbCl ₂	lead II chloride
Au ⁺³	O ⁻²	2:3	Au ₂ O ₃	Gold III oxide
Cu ⁺¹	S ⁻²	2:1	Cu ₂ S	Copper I sulfide
Ti ⁺³	N ⁻³	3:3 → 1:1	TiN	Titanium III nitride

Must use a Roman numeral in the name to show charge.
Roman numeral does NOT equal # of ions in formula.

Ionic Bonding Practice #2

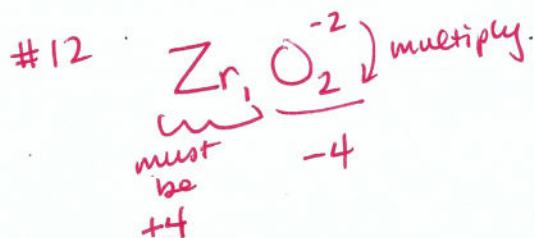
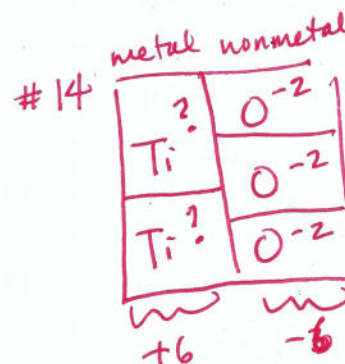
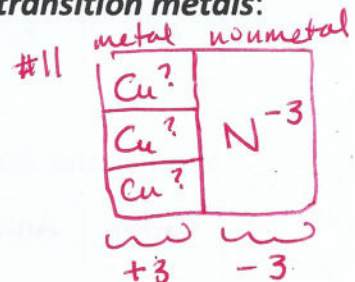
Write the name for these binary ionic compounds containing **main group metals**:

1. NaCl sodium chloride
2. Mg₃P₂ magnesium phosphide
3. Al₂O₃ aluminum oxide
4. CaBr₂ calcium bromide
5. LiF lithium fluoride
6. AgCl silver chloride
7. BaBr₂ barium bromide
8. K₃N potassium nitride
9. ZnS zinc sulfide
10. AlP aluminum phosphide

Even though these are "transition metals" (+1) (+2) Silver and Zinc do not change their charge so no need to use a Roman numeral

Use a **Roman numeral** to name these binary ionic compounds containing **transition metals**:

11. Cu₃N⁻³ copper I nitride
12. ZrO₂⁻² zirconium IV oxide
13. FeCl₂⁻¹ iron II chloride
14. Ti₂O₃⁻² titanium III oxide
15. CrF₄⁻¹ chromium IV fluoride
16. SnS₂⁻² tin IV sulfide
17. PbS₁⁻² lead II sulfide
18. PbO₂⁻² lead IV oxide
19. Ni₃P⁻³ nickel I phosphide
20. AuN⁻³ gold III nitride



6 ÷ 2 = 3
So use Roman numeral III

Must cancel out positive and negative charges.

Ionic Bonding Practice #3

Ionic Bonds Containing Main Group Metals & Polyatomic Ions:

Cation	Anion	Ion Ratio	Formula	Name
Na ⁺¹	CO ₃ ⁻²	2:1	Na ₂ CO ₃	sodium carbonate
K ⁺¹	OH ⁻¹	1:1	KOH	potassium hydroxide
Ca ⁺²	SO ₃ ⁻²	2:2 reduces to 1:1	CaSO ₃	calcium sulfite
Mg ⁺²	NO ₃ ⁻¹	1:2	Mg(NO ₃) ₂	magnesium nitrate
Ba ⁺²	ClO ⁻¹	1:2	Ba(ClO) ₂	barium hypochlorite
NH ₄ ⁺¹	Cl ⁻¹	1:1	NH ₄ Cl	ammonium chloride
Zn ⁺²	C ₂ O ₄ ⁻²	2:2 → 1:1	ZnC ₂ O ₄	zinc oxalate
Al ⁺³	PO ₄ ⁻³	3:3 → 1:1	AlPO ₄	aluminum phosphate

Ionic Bonds Containing Transition Metals & Polyatomic Ions:

Cation	Anion	Ion Ratio	Formula	Name
Fe ⁺²	OH ⁻¹	1:2	Fe(OH) ₂	iron II hydroxide
Sn ⁺⁴	SO ₄ ⁻²	2:4 reduces to 1:2	Sn(SO ₄) ₂	tin IV sulfate
Pb ⁺²	PO ₃ ⁻³	3:2	Pb ₃ (PO ₃) ₂	lead II phosphite
Ti ⁺³	ClO ₃ ⁻¹	1:3	Ti(ClO ₃) ₃	titanium III chlorate
Cu ⁺¹	CO ₃ ⁻²	2:1	Cu ₂ CO ₃	copper I carbonate
Ni ⁺²	NO ₂ ⁻¹	1:2	Ni(NO ₂) ₂	nickel II nitrite

Ionic Bonding Practice #4

Name these ionic compounds containing **main group metals** and **polyatomic ions**:

- | | |
|---|---------------------|
| 1. Ag_2O_2 | silver peroxide |
| 2. $\text{Ba}(\text{OH})_2$ | barium hydroxide |
| 3. ZnCr_2O_7 | zinc dichromate |
| 4. CaCO_3 | calcium carbonate |
| 5. $\text{Sr}_3(\text{PO}_4)_2$ | strontium phosphate |
| 6. NaBrO | sodium hypobromite |
| 7. $\text{Mg}(\text{NO}_3)_2$ | magnesium nitrate |
| 8. $\text{Al}_2(\text{SO}_4)_3$ | aluminum sulfate |
| 9. $\text{K}_2\text{C}_2\text{H}_3\text{O}_2$ | potassium acetate |
| 10. Li_3PO_4 | lithium phosphate |

Name these ionic compounds containing **transition metals** and **polyatomic ions**:

- | | |
|--------------------------------------|-------------------------|
| 11. NiNO_2^{-1} | nickel I nitrite |
| 12. $\text{Sn}(\text{SO}_4)_2^{-2}$ | tin IV sulfate |
| 13. $\text{Fe}(\text{CN})_2^{-1}$ | iron II cyanide |
| 14. $\text{Pb}(\text{SiO}_4)_2^{-2}$ | lead IV silicate |
| 15. AuBO_3^{-3} | gold III borate |
| 16. CuClO_2^{-1} | copper I chlorite |
| 17. $\text{Pt}(\text{CO}_3)_2^{-2}$ | platinum IV carbonate |
| 18. $\text{Ti}(\text{OH})_3^{-1}$ | titanium III hydroxide |
| 19. $\text{Mn}_3(\text{PO}_4)_7$ | manganese III phosphate |
| 20. $\text{Co}(\text{MnO}_4)_3$ | cobalt III permanganate |

#19

?	PO_4^{-3}
$\text{Mn}^?$	PO_4^{-3}
$\text{Mn}^?$	PO_4^{-3}
$\text{Mn}^?$	PO_4^{-3}
$\text{Mn}^?$	PO_4^{-3}
$\text{Mn}^?$	PO_4^{-3}

+21 -21

metal nonmetal

ex. #12

?	SO_4^{-2}
$\text{Sn}^?$	SO_4^{-2}

+4 -4

must cancel out

you need
to consider
the charge
on the negative
ion to
determine
the positive
ion's charge