



Compounds with Transition Metals

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Video Workbook with Dr. B

Ionic compounds are made of a Metal and a Non-Metal.

Metal + Non-Metal = Ionic Compound

Sometimes the metal will be a transition metal. We need to explicitly write the charge on the ion in the name.

The charge is written as a Roman Numeral in parentheses.

FeCl_2 = Iron (II) chloride

FeCl_3 = Iron (III) chloride

FeO = Iron (II) oxide

Fe_2O_3 = Iron (III) oxide

CuSO_4 = Copper (II) sulfate

CuO = Copper (II) oxide

Keys for Naming Compounds with Transition Metals

- Write the name of transition metal as it appears on the Periodic Table.
- Write the name and [charge for the non-metal](#). If you have a polyatomic ion, use the [Polyatomic Ion Table](#) to find and write the formula and charge.
- Use the total charge on the non-metal (or polyatomic ion) to find the charge on the transition metal.
- After the name for the metal, write its charge as a Roman Numeral in parentheses.
Example: Iron (III) chloride

Example ([video explanation](#)): Write the name for CuCl_2 .

- From the Periodic Table, Cu is Copper, Cl is Chlorine.
- Write Copper Chlorine but replace the *-ine* in Chlorine with *-ide*. We get Copper Chloride.
- We don't know the charge on Cu since it is a Transition Metal. But Cl has a 1- charge.
- Since we have two Cl atoms, and each is 1-, we have a total of 2-. So Cu must be 2+.
- Write the charge on Cu as a Roman Numeral in parentheses.
- We get Copper (II) chloride as the name for CuCl_2 .

Essential Video: [How to Name Ionic Compounds w/ Transition Metals](#)



Practice with Explanations

[Extensive interactive practice naming compounds with transition metals.](#)

This is one of the most effective ways to learn naming and formula writing.

Formula Writing for Ionic Compounds with Transition Metals

Keys to Writing Formulas for Ionic Compounds with Transition Metals:

- Write the symbol for each element.
- Find [the charge for each element](#) using the Periodic Table. Write it above each element.
- See if the charges are balanced (if they are you're done!)
- Add subscripts (if necessary) so the charge for the entire compound is zero.
- Use the [criss-cross method](#) to check your work.

- Don't write the subscript '1'.
- If you use the criss-cross method and end up with something like Ca_2S_2 you'll need to reduce the subscripts to Ca_1S_1 which we write as CaS .

The general trend for ionic charge follows the groups on the Periodic Table.

Transition Metals can vary depending on what elements they are bonded to.

We find [the charge on the transition metal](#) by looking at the elements it is bonded to.



Example ([video explanation](#)): Write the formula for Iron (III) oxide.

- From the Periodic Table, Fe is Iron, O is Oxygen.
- Write Iron oxide.
- We don't know the charge on Fe since it is a Transition Metal. But the O is 2-.
- Since there are three O atoms, the total charge is 6-. So we need to balance this charge.
- We have two Fe atoms so each will have to be 3+ to give us 6+. So each Fe will be 3+.
- Write the charge on Fe as a Roman Numeral in parentheses.
- We get Iron (III) oxide as the name for Fe₂O₃.

Example: CoSO₄

- From the Periodic Table, Co is Cobalt, SO₄²⁻ is the Sulfate ion.
- Write Cobalt sulfate.
- We don't know the charge on Co since it is a Transition Metal. But the Sulfate ion is 2-.
- Since SO₄ is 2- the Co must be 2+ for the charges to balance. So the charge on Co is 2+.
- Write the charge on Co as a Roman Numeral in parentheses.
- We get Cobalt (II) sulfate as the name for CoSO₄.

Essential Video: [Formulas for Ionic Compounds with Transition Metals](#)

Practice with Explanations and Answers

[Interactive practice writing formulas for ionic compounds with transition metals.](#)

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