

Writing Formulas Flow Chart

Does the name of the formula include the word "ion"?

no – go to

the next page

yes – simply write the formula of the ion. Use the periodic table to help you with the charges (oxidation numbers) of monoatomic ions.

Cation Help

NH_4^{1+} is ammonium ion. Transition metals and the metals to the right of the transition metals on the periodic table have a roman numeral in the name to indicate the oxidation state of the metal **except for zinc, cadmium and silver**. Other cations get the charge based on the number of valence electrons they will lose to achieve a noble gas configuration.

example: iron (III) ion is Fe^{+3} aluminum ion is Al^{+3} silver ion is Ag^{+1} sodium ion is Na^{+1}

Notice that all elements with "ion" in the name **must** have a charge in the formula.

Anion Help

1. You **must** memorize the 13 "standard" anions, both the number of atoms and the charge. Most of these end in "ate", the two exceptions are hydroxide ion (OH^{1-}) and cyanide ion (CN^{1-}).
2. If there is one more oxygen than the "standard" ion the prefix of "per" is added to the name. Example chlorate ion is ClO_3^{1-} so if the ion you are considering is ClO_4^{1-} the name is perchlorate ion.
3. If there is one less oxygen than the "standard" ion the "ate" ending is changed to an "ite" ending. Example: chlorate ion is ClO_3^{1-} so if the ion you are considering is ClO_2^{1-} the name is chlorite ion.
4. If there are two less oxygen than the "standard" ion, a "hypo" prefix is added and the "ate" ending is also changed to an "ite" ending. Example: chlorate ion is ClO_3^{1-} so if the ion you are considering is ClO^{1-} the name is hypochlorite ion.
5. If there is a hydrogen attached to the "standard" ion (also changing the charge by +1) a prefix of "bi" **or** "hydrogen" is used to indicate this. Example: sulfate ion is SO_4^{2-} so HSO_4^{1-} is bisulfate ion or hydrogen sulfate ion.
6. If the anion is a single element change the name to end in "ide". Example NH_4Cl the name of the anion is chloride ion (Cl^{1-}). The name of the compound is ammonium chloride.

