

# This is the stuff you need to memorize!

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## Rules for Naming and Acid

When the name of the anion ends in *-ide*, the acid name begins with the prefix *hydro-*, the stem of the anion has the suffix *-ic* and it is followed by the word *acid*.

*-ide* becomes hydro \_\_\_\_\_ *ic Acid*

$\text{Cl}^-$  is the Chloride ion so  $\text{HCl}$  = hydrochloric acid

When the anion name ends in *-ite*, the acid name is the stem of the anion with the suffix *-ous*, followed by the word *acid*.

*-ite* becomes \_\_\_\_\_ *ous Acid*

$\text{ClO}_2^-$  is the Chlorite ion so  $\text{HClO}_2$  = Chlorous acid.

When the anion name ends in *-ate*, the acid name is the stem of the anion with the suffix *-ic*, followed by the word *acid*.

*-ate* becomes \_\_\_\_\_ *ic Acid*

$\text{ClO}_3^-$  is the Chlorate ion so  $\text{HClO}_3$  = Chloric acid.

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## Rules for Naming Ionic Compounds

1. **Balance Charges (charges should equal zero)**
2. **Cation is always written first (in name and in formula)**
3. **Change the ending of the anion to *-ide***

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## Solubility Rules

1. **All compounds containing alkali metal cations and the ammonium ion are soluble.**
2. **All compounds containing  $\text{NO}_3^-$ ,  $\text{ClO}_4^-$ ,  $\text{ClO}_3^-$ , and  $\text{C}_2\text{H}_3\text{O}_2^-$  anions are soluble.**
3. **All chlorides, bromides, and iodides are soluble except those containing  $\text{Ag}^+$ ,  $\text{Pb}^{2+}$ , or  $\text{Hg}^{2+}$ .**
4. **All sulfates are soluble except those containing  $\text{Hg}^{2+}$ ,  $\text{Pb}^{2+}$ ,  $\text{Sr}^{2+}$ ,  $\text{Ca}^{2+}$ , or  $\text{Ba}^{2+}$ .**
5. **All hydroxides are insoluble except compounds of the alkali metals,  $\text{Ca}^{2+}$ ,  $\text{Sr}^{2+}$ , and  $\text{Ba}^{2+}$ .**
6. **All compounds containing  $\text{PO}_4^{3-}$ ,  $\text{S}^{2-}$ ,  $\text{CO}_3^{2-}$ , and  $\text{SO}_3^{2-}$  ions are insoluble except those that also contain alkali metals or  $\text{NH}_4^+$ .**

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## Rules for Determining Oxidation Number

**Oxidation Number:** A number assigned to an atom in a molecular compound or molecular ion that indicates the general distribution of electrons among the bonded atoms.

1. The oxidation number of any uncombined element is zero (0).
2. The oxidation number of a monatomic ion equal the charge on the ion.
3. The more electronegative element in a binary compound is assigned the number equal to the charge it would have if it were an ion.
4. The oxidation number of fluorine in a compound is always  $-1$
5. Oxygen has an oxidation number of  $-2$  unless it is combined with F, when it is  $+2$ , or it is in a peroxide, when it is  $-1$ .
6. The oxidation state of hydrogen in most of its compounds is  $+1$  unless it combined with a metal, in which case it is  $-1$ .
7. In compounds, the elements of groups 1 and 2 as well as aluminum have oxidation number of  $+1$ ,  $+2$ , and  $+3$ , respectively
8. The sum of the oxidation numbers of all atoms in a neutral compound is 0.
9. The sum of the oxidation number of all atoms in a polyatomic ion equals the charge of the ion.

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### Variable Valences For Transition Metals

Name	Symbol	Charge	Stock Name
Chromium	Cr	+2	Chromium (II)
		+3	Chromium (III)
Manganese	Mn	+2	Manganese (II)
		+3	Manganese (III)
Iron	Fe	+2	Iron (II)
		+3	Iron (III)
Cobalt	Co	+2	Cobalt (II)
		+3	Cobalt (III)
Copper	Cu	+1	Copper (I)
		+2	Copper (II)
Lead	Pb	+2	Lead (II)
		+4	Lead (IV)
Mercury	Hg	+1	Mercury (I)
		+2	Mercury (II)
Tin	Sn	+2	Tin (II)
		+4	Tin (IV)
Gold	Au	+1	Gold (I)
		+3	Gold (III)
Silver	Ag	+1	Silver
		+2(rarely)	Silver (II)

Bismuth	Bi	+3	Bismuth (III)
		+5	Bismuth (V)
Antimony	Sb	+3	Antimony (III)
		+5	Antimony (V)
Cadmium	Cd	+2	Cadmium
Zinc	Zn	+2	Zinc

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## Polyatomic Ions

Name	Symbol	Charge
ammonium	NH <sub>4</sub>	+1
acetate	C <sub>2</sub> H <sub>3</sub> O <sub>2</sub>	-1
bromate	BrO <sub>3</sub>	-1
chlorate	ClO <sub>3</sub>	-1
chlorite	ClO <sub>2</sub>	-1
cyanide	CN	-1
dihydrogen phosphate	H <sub>2</sub> PO <sub>4</sub>	-1
hypochlorite	ClO	-1
hydrogencarbonate(bicarbonate)	HCO <sub>3</sub>	-1
hydrogen sulfate (bisulfate)	HSO <sub>4</sub>	-1
hydrogen sulfite (bisulfite)	HSO <sub>3</sub>	-1
hydroxide	OH	-1
iodate	IO <sub>3</sub>	-1
nitrate	NO <sub>3</sub>	-1
nitrite	NO <sub>2</sub>	-1
perchlorate	ClO <sub>4</sub>	-1
permanganate	MnO <sub>4</sub>	-1
thiocyanate	SCN	-1
carbonate	CO <sub>3</sub>	-2
chromate	CrO <sub>4</sub>	-2
dichromate	Cr <sub>2</sub> O <sub>7</sub>	-2
oxalate	C <sub>2</sub> O <sub>4</sub>	-2
selenate	SeO <sub>4</sub>	-2
silicate	SiO <sub>3</sub>	-2
sulfate	SO <sub>4</sub>	-2
sulfite	SO <sub>3</sub>	-2
phosphate	PO <sub>4</sub>	-3
phosphite	PO <sub>3</sub>	-3