Ionic Compounds with Polyatomic Ions

Polyatomic ion: groups of atoms that tend to stay together and carry an overall ionic charge.

Spelling matters! Some polyatomic ions have very similar spelling.

ex. NO_3^- ***= Nitrate***
OH^- ***= Hydroxide***
PO_4^{3-} ***= Phospate***

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Naming is the same as other ionic, except the polyatomic ion DOES NOT change its ending.

Ex:

$CaCO_3$ calcium carbonate

$MgSO_4$ magnesium sulfate

NH_4Cl ammonium chloride

Li_2CrO_4 Lithium chromate

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Formulas

* Same rules as other ionic compounds

* If more than one polyatomic ion needed, put brackets around it.

EX: Aluminum hydroxide

$Al^{3+}(OH)^{1-}_3$ → $Al(OH)_3$

Try...

Sodium permanganate: $Na^{1+}MnO_4^{1-}$ ✓

Magnesium chlorite: $Mg^{2+}(ClO_2^{1-})_2$

Ammonium nitrate: $NH_4^{1+}NO_3^{1-}$

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Multivalent polyatomic compounds

* $Cu^{2+}(HS^{2-})_2$ copper (II) bisulfide

* $Ni^{3+}(OH^{3-})_3$ nickel (III) hydroxide

* $tin^{4+}(IV)\ sulfate^{2-}_2$ $Sn(SO_4)_2$

* $gold^{3+}(III)\ cyanide^{1-}_3$ $Au(CN)_3$

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Name the following compounds.

1. $Ba(ClO_3)_2$ Barium chlorate
2. $Ga(HCO_3)_3$ galium bicarbonate
3. Ag_2SO_3 silver sulfite
4. $MgCO_3$ magnesium carbonate
5. NH_4NO_2 ammonium nitrite
6. $Al(C_2H_3O_2)_3$ aluminum acetate
7. $SrSO_4$ strontium sulfate
8. $RbClO_2$ rubidium chlorite
9. $Ca(HSO_3)_2$ calcium bisulfite
10. H_3OCl hydronium hypochlorite
11. $NaNO_3$ sodium nitrate
12. $Be(OH)_2$ beryllium hydroxide

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Name the following compounds.

1. $Ni(MnO_4)_3$ nickel (III) permanganate
2. $CrSO_4$ chromium(II) sulfate
3. $Sn(C_2H_3O_2)_4$ tin (IV) acetate
4. Cu_2SiO_3 copper (II) silicate
5. $MnCrO_4$ manganese (II) chromate
6. $Au(OH)_3$ gold (III) hydroxide
7. $SbBO_3$ antimony (III) borate
8. $HgHCO_3$ mercury (I) bicarbonate
9. $Pb(ClO_2)_2$ lead (II) chlorite
10. $Fe(SCN)_3$ iron (III) thiocyanate

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Write formulas.

1. beryllium hydroxide $Be(OH)_2$
2. sodium nitrite $NaNO_2$
3. ammonium chloride NH_4Cl
4. calcium dichromate $CaCr_2O_7$
5. rubidium perchlorate $RbClO_4$
6. strontium sulfite $SrSO_3$
7. aluminum acetate $Al(CH_3COO)_3$
8. ammonium nitrate NH_4NO_3
9. magnesium hypochlorite $Mg(ClO)_2$
10. silver thiosulfate $Ag_2S_2O_3$
11. gallium cyanide $Ga(CN)_3$
12. barium phosphate $Ba_3(PO_4)_2$

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Write formulas.

1. iron(III) tetraborate $Fe_2(B_4O_7)_3$
2. copper(I) hydroxide $CuOH$
3. mercury(II) perchlorate $Hg(ClO_4)_2$
4. mercury(I) bicarbonate $HgHCO_3$
5. antimony(III) thiosulfate $Sb_2(S_2O_3)_3$
6. arsenic(V) dichromate $As_2(Cr_2O_7)_5$
7. manganese(II) glutamate $Mn(C_5H_8NO_4)_2$
8. copper(I) sulfate Cu_2SO_4
9. tin(IV) acetate $Sn(CH_3COO)_4$
10. nickel(III) permanganate $Ni(MnO_4)_3$

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