

HINTS for understanding and memorizing selected polyatomic ions

1⁺ CHARGE:

ammonium (NH₄)⁺

- Ammonia is NH₃ (a good formula to know), so it is closely related to ammonium.
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1⁻ CHARGE:

acetate (C₂H₃O₂)⁻ or (CH₃COO)⁻

- acetic acid is HC₂H₃O₂

perchlorate (ClO₄)⁻, chlorate (ClO₃)⁻, chlorite (ClO₂)⁻, and hypochlorite (ClO)⁻

- The Cl refers to *chlorine*, not carbon and iodine. Notice the *chlor* in the names.
- Think of a countdown: 4, 3, 2, 1... The amount of O decreases that way for all four ions.
- *Perchlorate* is *hyper*, so it “ATE the most.” It has 4 O’s.
- *Chlorate* “ATE more than chlorite” so it has more O’s than chlorite: 3 instead of 2.
- *Hypo* has one less O than chlorite (hypo = less; opposite of hyper = more).
- The charge on all four is 1-... remember that Cl forms a 1- ion.

cyanide (CN)⁻

- CyaNide is the *one* to kill you (charge is 1-). Yes, cyanide is lethal.

hydrogen carbonate or bicarbonate (HCO₃)⁻

- Hydrogen means adding one H to the formula, and (CO₃) refers to the carbonate ion, (CO₃)²⁻
- The (CO₃) ion has a charge of 2-, and there is one H added here (H is usually a 1+ ion), which changes the overall charge to 1- (-2 + 1 = -1)

hydroxide (OH)⁻

- HydrOxide is the *one* (charge is 1-).

nitrate (NO₃)⁻ and nitrite (NO₂)⁻

- Nitrate “ATE more” so it has more O’s than nitrite: 3 instead of 2.

permanganate (MnO₄)⁻

- *Mang* refers to manganese, Mn.
 - *Permanganate* has the same amount of O’s as *perchlorate*: 4
 - *Permanganate* has the same charge as *perchlorate*: 1-
 - See **perchlorate (ClO₄)⁻** for comparison
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2⁻ CHARGE:

carbonate (CO₃)²⁻

- The carbonate ion has carbon at the main atom.

chromate (CrO₄)²⁻

- The chromate ion has chromium as the main atom.
- The charge is the same as the **chromate ion**.

dichromate (Cr₂O₇)²⁻

- The dichromate ion has TWO chromium atoms instead of one
- The charge is the same as the chromate ion

silicate (SiO₃)²⁻

- The silicate ion has silicon at the main atom.

sulfate (SO₄)²⁻ and sulfite (SO₃)²⁻

- Sulfate “ATE more, ATE four” so it has more O’s than sulfite: 4 instead of 3.
- The charge on both is 2-... remember that S forms a 2- ion.

3⁻ CHARGE:

phosphate (PO₄)³⁻ and phosphite (PO₃)³⁻

- Phosphate “ATE more, ATE four” so it has more O’s than phosphite: 4 instead of 3.
- The charge is 3-... remember that P forms a 3- ion.