

Ions and Ion Notation

Atoms

There are two categories of atoms:
neutral atoms and ions.

Neutral Atoms
 $p - e = 0$ OR
 $p = e$

Ions
 $p - e \neq 0$ OR
 $p \neq e$

Ions are atoms that have gained or lost electrons. Ions do not have the same number of protons and electrons. Because ions have a charge they will attract atoms of the opposite charge (opposites attract).

Most atoms are neutral (having no charge) in their natural state. They are neutral because they have the same number of protons and electrons. Being neutral they do not attract other atoms.

Cations:
+ ions (metals)
 $p - e > 0$ OR $p > e$

Anions:
- ions (nonmetals)
 $p - e < 0$ OR $p < e$

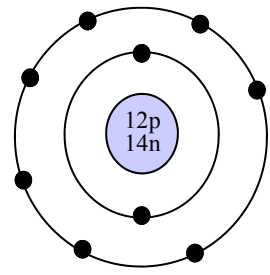
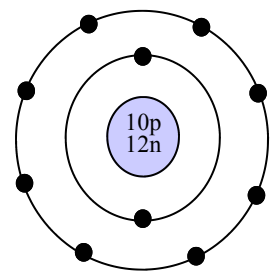
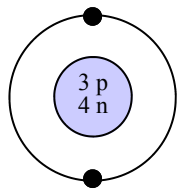
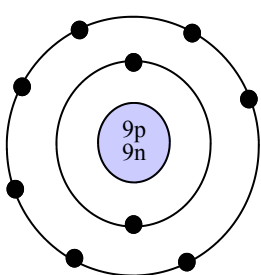
Ex. 6 protons and 6 electrons.
Charge: $6 - 6 = 0$, so *neutral*.
6 protons = C (Carbon),
Ion Notation: C
(Technically, this isn't "ion notation" because it isn't an ion.)

Cations are atoms that have lost electrons. Cations are positive. (Cations gouh up electrons.)
Cations attract anions.

Anions are atoms that have gained electrons. Anions are negative. (Anions accept electrons.)
Anions attract cations.

Ex. 4 protons and 2 electrons.
Charge: $4 - 2 = 2 > 0$, so *cation*.
4 protons = Be (Beryllium),
Ion Notation: Be^{2+}

Ex. 9 protons and 10 electrons.
Charge: $9 - 10 = -1 < 0$, so *anion*.
9 protons = F (Fluorine),
Ion Notation: F^{1-}



Protons:
Electrons:
Charge:
Neutral or Ion?
(Cation or Anion)
Ion Notation:

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Balanced Ionic Compounds

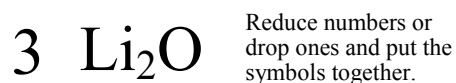
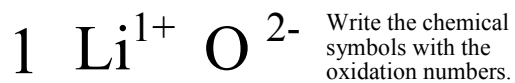
When you are asked to balance or make ionic compounds you are being asked to find the chemical formula for the ionic compounds. Remember: opposites attract; neutrals don't.

A balance ionic compound is neutral.

The cation and anion charges must equal zero.

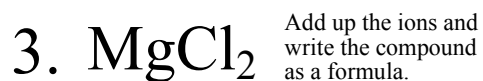
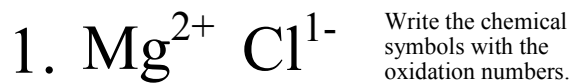


Way 1



You know it is a balanced compound because $2(1) + 1(-2) = 0$. Balanced ionic compounds have a neutral charge.

Way 2



Again, you know it is a balanced compound because $1(2) + 2(-1) = 0$. Balanced ionic compounds have a neutral charge.