Ions and Ionic Compounds

If electrons are added to or removed from a neutral atom, an **ion** is formed
When an atom or molecule loses electrons it becomes positively charged
Positively charged ions are called **cations.**
When an atom or molecule gains electrons it becomes negatively charged
Negatively charged ions are called **anions.**
In general, metal atoms tend to lose electrons and nonmetals atoms gain electrons.
When molecules lose electrons, **polyatomic ions** are formed (e.g.SO_4^{2-} , NO_3^-).

Predicting Ionic Charges

An atom or molecule can lose more than one electron.
Manu atoms gain or lose enough electrons to have the same number of electrons as the nearest noble gas (group 8A)
The number of electrons an atom loses is related to its position on the periodic table.

Ionic compounds

A great deal of chemistry involves the transfer of electrons between species
Example: Na^+ and Cl^- form the neutral ionic compound NaCl, Mg_3N_2 (3 Mg^{2+}, 2 N^{3-}).
Ionic compounds are named cation then anion. Calcium chloride, barium bromide.

Formation of ions

- Cation—formed by loss of an electron, positive charge
- Anion—formed by gain of an electron, negative charge
- Ionic bonds—formed by interaction of cations and anions

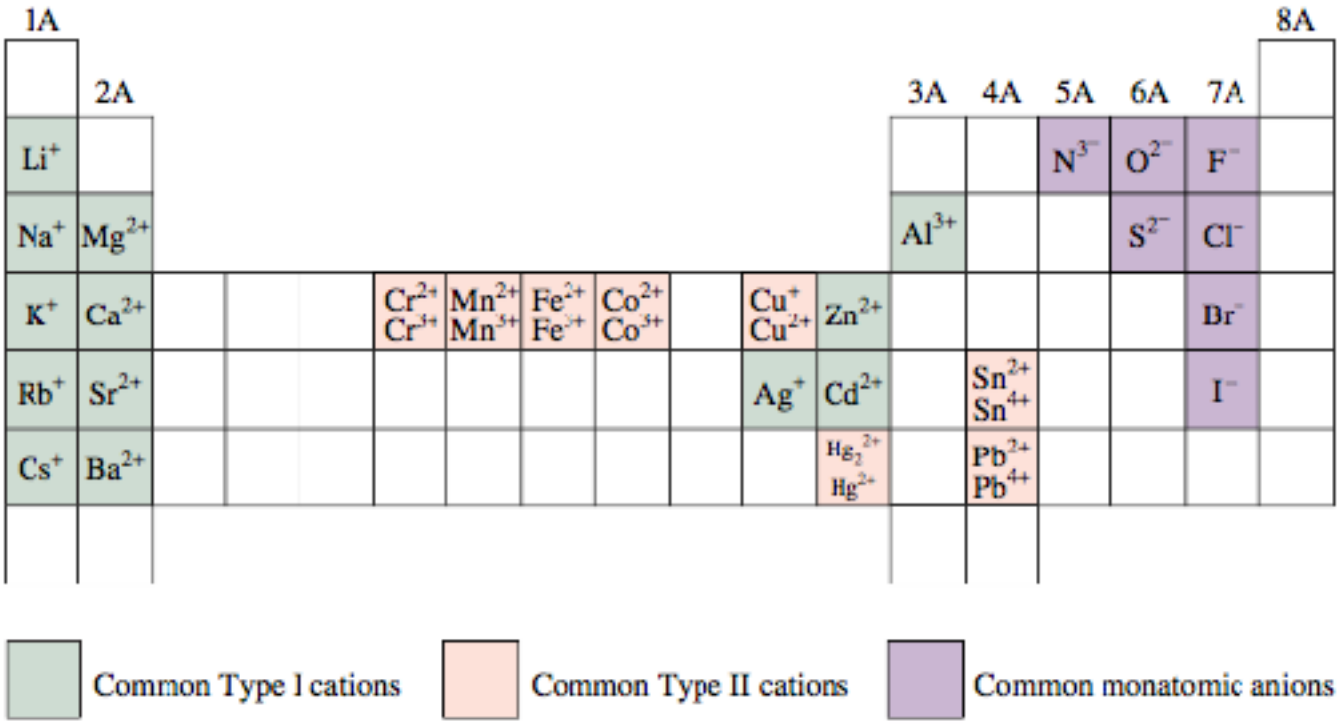

TABLE 2.5 Common Polyatomic Ions

Ion	Name	Ion	Name
Hg_2^{2+}	Mercury(I)	NCS^-	Thiocyanate
NH_4^+	Ammonium	CO_3^{2-}	Carbonate
NO_2^-	Nitrite	HCO_3^-	Hydrogen carbonate (bicarbonate is a widely used common name)
NO_3^-	Nitrate		
SO_3^{2-}	Sulfite		
SO_4^{2-}	Sulfate	ClO^-	Hypochlorite
HSO_4^-	Hydrogen sulfate (bisulfate is a widely used common name)	ClO_2^-	Chlorite
		ClO_3^-	Chlorate
		ClO_4^-	Perchlorate
OH^-	Hydroxide	$C_2H_3O_2^-$	Acetate
CN^-	Cyanide	MnO_4^-	Permanganate
PO_4^{3-}	Phosphate	$Cr_2O_7^{2-}$	Dichromate
HPO_4^{2-}	Hydrogen phosphate	CrO_4^{2-}	Chromate
$H_2PO_4^-$	Dihydrogen phosphate	O_2^{2-}	Peroxide
		$C_2O_4^{2-}$	Oxalate