

# Determining Oxidation Numbers

- 1) Each atom in a pure element has an oxidation number = 0.
- 2) For ions consisting of a single atom, the oxidation number is equal to the charge on the ion.
- 3) **Fluorine** is *always* -1.
- 4) **Chlorine, bromine and iodine** are *always* -1 except when combined with oxygen or fluorine.
- 5) The oxidation number of **hydrogen** is +1 and of **oxygen** is -2.  
*Exceptions:* hydrides ( $\text{H}^{-1}$ ), peroxides ( $\text{O}^{-1}$ ), OF compounds.
- 6) In neutral compounds, the sum of the oxidation numbers must be zero. In polyatomic ions, the sum of the oxidation numbers must be equal to the ion charge.

*Examples:*

<b>Cu(s)</b>	Cu: 0	<b>NaCl</b>	Cl: -1 Na: +1
<b>NaF</b>	F: -1 Na: +1	<b>ClO<sup>-</sup></b>	Cl: +1 O: -2
<b>Al<sup>3+</sup></b>	Al: +3	<b>Fe<sub>2</sub>O<sub>3</sub></b>	Fe: +3 O: -2
<b>H<sub>2</sub>O<sub>2</sub></b>	H: +1 O: -1	<b>AlH<sub>4</sub><sup>-</sup></b>	Al: +3 H: -1
	<b>KMnO<sub>4</sub></b>	K: +1 Mn: +7 O: -2	