

Announcements

Wednesday, October 07, 2009

MasteringChemistry due dates (all at 11:59pm)

- Ch 4: Wed, Oct 14
- Ch 5: Fri, Oct 23
- Ch 6: Fri, Oct 30

Lab report due dates (all at 3:00pm):

- Exp 5: Wed, Oct 14
- Exp 6: Mon, Oct 19

Oxidation-reduction reactions

Oxidation-reduction (redox) reaction: electrons are transferred from one reactant to the other

Oxidation numbers: keep track of electrons in a reaction

Rules for Assigning Oxidation Numbers (must be memorized)

Rule	Applies to	Statement
1	Elements	The oxidation number of an atom in an element is zero
2	Monatomic ions	The oxidation number of an atom in a monatomic ion equals the charge on the ion.
3	Oxygen	The oxidation number of oxygen is -2 in most of its compounds. (An exception is O in H ₂ O ₂ and other peroxides, where the oxidation number is -1.)
4	Hydrogen	The oxidation number of hydrogen is +1 in most of its compounds. (The oxidation number of hydrogen is -1 in binary compounds with a metal, such as CaH ₂ .)
5	Halogens	The oxidation number of fluorine is -1 in all of its compounds. Each of the other halogens (Cl, Br, I) has an oxidation number of -1 in binary compounds, except when the other element is another halogen above it in the periodic table or the other element is oxygen.
6	Compounds and ions	The sum of the oxidation numbers of the atoms in a compound is zero. The sum of the oxidation numbers of the atoms in a polyatomic ion equals the charge on the ion.

What is the oxidation number of sulfur in Na₂SO₄?

$$\begin{array}{l} S + 4(-2) = -2 \quad (\text{sulfate ion}) \quad \text{or} \quad 2(+1) + S + 4(-2) = 0 \quad (\text{whole compound}) \\ S - 8 = -2 \\ \boxed{S = 6} \end{array}$$

What is the oxidation # of P in P₂O₅?

$$\begin{array}{l} 5(-2) + 2P = 0 \\ -10 + 2P = 0 \rightarrow 2P = 10 \\ \boxed{P = 5} \end{array}$$

Oxidation-reduction reactions

oil RIG
LEO GER

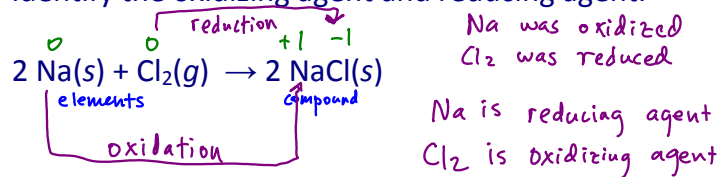
Oxidation: loss of electrons (oxidation # increases)

Reduction: gain of electrons (oxidation # decreases)

Oxidizing agent: the reactant that is itself reduced

Reducing agent: the reactant that is itself oxidized

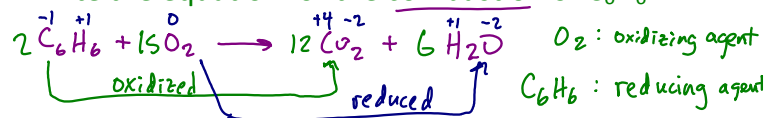
Identify the elements that are oxidized and reduced, and identify the oxidizing agent and reducing agent.



Combustion reaction: an oxidation reduction reaction with O_2 as a reactant.

Carbon-containing compounds undergo combustion to form CO_2 and H_2O

Write the equation for the combustion of C_6H_6



Metals undergo combustion to form metal oxides.

