

Oxidation/Reduction

Oxidation Reduction Reactions

Definitions

- Oxidation
 - Loss of electrons by a substance
 - Charge becomes more positive
- Reduction
 - Gain of electrons by a substance
 - Charge becomes more negative
- The charge of the particle being reduced is reduced
- Oil Rig
- Redox (Oxidation/Reduction) Reaction
 - Reaction in which electrons are exchanged between substances
 - The charge (oxidation number) of the substances change

Oxidation Reduction Reactions

Rules for Assigning Oxidation Numbers

- All atoms in elemental form have an oxidation number of 0
- For any monatomic ion, the oxidation number equals the charge of the ion
- Nonmetals usually have negative oxidation numbers
- Hydrogen is +1 when bonded to nonmetals and -1 when bonded to metals
- The sum of the oxidation numbers of all atoms in a compound is 0
- The sum of the oxidation numbers of all atoms in a polyatomic ion is the charge of the ion

Oxidation Reduction Reactions

Rules for Assigning Oxidation Numbers



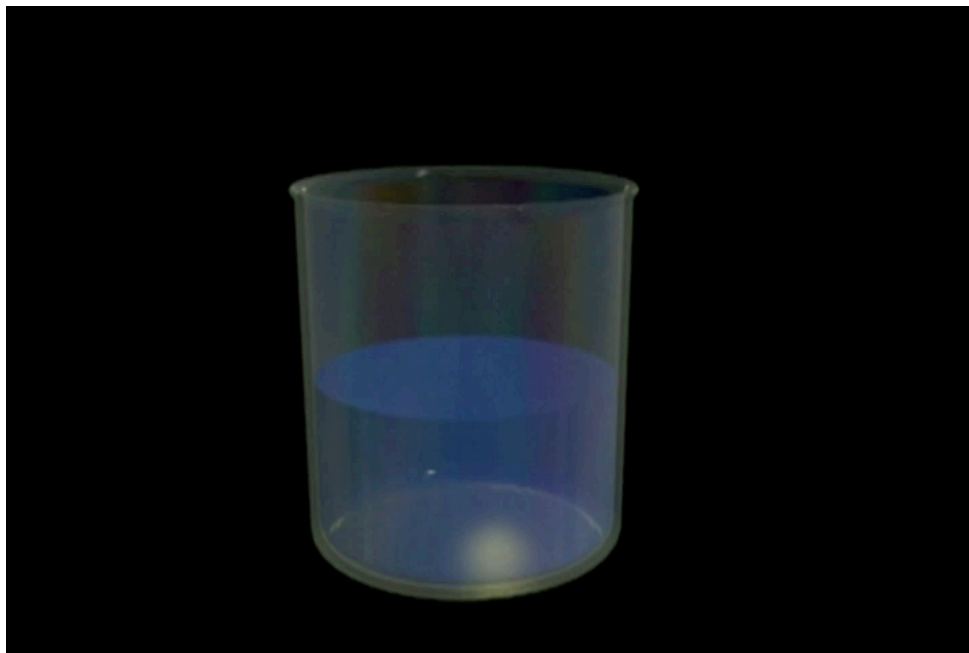
Oxidation Reduction Reactions

Oxidation of Metals by Acids and Salts

- These are generally single displacement reactions
 - The metal begins in elemental form and is ionized by an acid or a salt
- By an acid
 - $\text{Zn}_{(s)} + 2 \text{HCl}_{(aq)} \implies$
- By a salt
 - $\text{Zn}_{(s)} + \text{CuSO}_{4(aq)} \implies$

Voltaic Cells

Background



Oxidation Reduction Reactions

Homework

- 4.45, 47, 49, 51, 53