

Oxidation and Reduction

Relates to electron sharing between carbon and oxygen atoms

- Carbons with more hydrogens attached are called reduced
 - Carbons in this case have strong pull on electrons and 'take' electrons (use a greater 'share' of the electrons)
- Carbons with more oxygens or nitrogens are oxidized
 - Carbons in this case have less pull on electrons and 'give' electrons (use a smaller 'share' of the electrons)
 - Oxygen or nitrogen in this case have strong pull and 'take' more electrons
- Carbons have 4 electrons to share, so they can exist in multiple oxidation states... from completely reduced to completely oxidized
 - It depends on whether the carbon has more hydrogens or more oxygens directly attached
 - A reduced carbon would be CH_4
 - An oxidized carbon would be CO_2
- Highly reduced carbon strings have lots of energy
 - When burned with oxygen there is more oxidation occurring.

Oxidation and Reduction in Chemical Reactions

- Oxidation is the loss of electrons, reduction is the gain of electrons
- When one molecule becomes oxidized, another molecule becomes reduced, etc...
- NAD^+ is an oxidizer
 - In Glycolysis it takes electrons and becomes reduced (NADH) and it oxidizes PGAL to DPG in the process

Electron Transport or Transfer

- The controlled movement of electrons to allow work to be done
- This occurs in 'electron transport systems'
 - An array of enzymes and coenzymes that accept and donate electrons in a specific sequence
 - Each molecule accepts electrons from the previous molecule and passes electrons to the next molecule
 - Electrons are passed in pairs only
 - Electrons are accepted at high energy levels and released/passed-on at low energy levels
 - Energy is released with each electron transfer
 - This energy can sometimes be used to do work, such as move ions across a membrane (H^+ ions)