Electron Acceptor and Donor Encyclopedia Article

Electron Acceptor and Donor

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Electron Acceptor and Donor

Electron acceptors are ions or molecules that act as oxidizing agents in chemical reactions. Electron donors are ions or molecules that donate electrons and are reducing agents. In the **combustion** reaction of gaseous **hydrogen** and oxygen to produce water (H_2O), two hydrogen atoms donate their electrons to an oxygen atom. In this reaction, the oxygen is reduced to an oxidation state of -2 and each hydrogen is oxidized to +1. Oxygen is an **oxidizing agent** (electron acceptor) and hydrogen is a reducing agent (electron donor). In **aerobic** (with oxygen) biological **respiration**, oxygen is the electron acceptor accepting electrons from organic **carbon** molecules; and as a result oxygen is reduced to -2 oxidation state in H_2O and organic carbon is oxidized to +4 in CO_2. In flooded soils, after oxygen is used up by aerobic respiration, nitrate, sulfate, as well as iron and manganese oxides can act as electron acceptors for microbial respiration. Other common electron acceptors include peroxide and hypochlorite (household bleach) which are bleaching agents because they can oxidize organic molecules. Other common electron donors include antioxidants like sulfite.