

Acrolein Encyclopedia Article

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Acrolein

Acrolein (also called acrylaldehyde) is the generic or general name for the chemical substance 2-propenal. It is a very simple compound, consisting of three carbons, one **oxygen**, and four hydrogens, but its simplicity is deceiving. Acrolein has a number of interesting features from a chemical point of view. First, the oxygen is contained in a carbonyl, an organic **functional group** where the oxygen and **carbon** are double-bonded. But the other two carbon atoms are also double-bonded to each other, which results in **conjugation** of the **electron density** in the bonds. This means that the two bonds form a single system that covers the whole **molecule**. The result is that acrolein absorbs ultraviolet light, a property that industrial manufacturers take advantage of in making such things as sunglasses which absorb ultraviolet radiation.

Unfortunately, acrolein has a bad side as well. At high concentrations, it is thought to be both a mutagen (a substance capable of causing mutations) and a carcinogen (a substance capable of causing cancer). The use of acrolein is carefully monitored as it is a very useful compound in the manufacture of **plastics**, artificial resins, synthetic fibers, and **polyurethane** foams, but also is a potentially toxic substance for humans and the environment. The highly reactive nature of acrolein is the basis of its toxicity. Acrolein's vapors are very irritating to the eyes, skin, and mucous membranes, and this chemical contributes significantly to the irritating quality of cigarette smoke and photochemical smog.