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Methanol

Applications using Methanol

Methanol is a common laboratory solvent. It is especially useful for HPLC and UV/VIS spectroscopy due to its low UV cutoff.

Feedstock

By far, the largest use of **Methanol** is in manufacture of other chemicals. Approximately 40 percent of **Methanol** is converted to formaldehyde. It is then used to make other products as diverse as plastics, plywood, paints, explosives, and permanent press textiles.

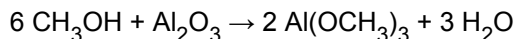
In the early 1970s, Mobil developed a **Methanol** to gasoline process for producing vehicle ready gasoline. One of the facilities was built in New Zealand at Motunui in the 1980s. Then in the 1990s, the United States used large amounts of **Methanol** to produce the gasoline additive methyl tert-butyl ether (MTBE). MTBE was taken off the market in the US, it is still widely used in other parts of the world. In addition to direct use as a fuel, **Methanol** is a component in the transesterification of triglycerides to yield a form of biodiesel.

Other chemical derivatives of **Methanol** include dimethyl ether, which has replaced chlorofluorocarbons as an aerosol spray propellant, and acetic acid. Dimethyl ether or "DME" also can be blended with liquefied petroleum gas (LPG) for home heating and cooking, and can be used as a diesel replacement transportation fuel.

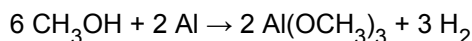
Fuel for vehicles

Methanol is used to fuel internal combustion engines on a limited basis, primarily because it is not nearly as flammable as gasoline. **Methanol** is more difficult to ignite than gasoline and produces just one-eighth of the heat. Many racing classes including drag racers and mud racers use **Methanol** as their primary fuel source. **Methanol** is required with a supercharged engine in a Top Alcohol Dragster and, until the end of 2006, all vehicles in the Indianapolis 500 had to run **Methanol**. Mud racers have mixed **Methanol** with gasoline and nitrous oxide to produce more power than gasoline and nitrous oxide alone.

One of the drawbacks of **Methanol** as a fuel is its corrosivity to some metals, including aluminium. **Methanol**, although a weak acid, attacks the oxide coating that normally protects the aluminium from corrosion:



The resulting methoxide salts are soluble in **Methanol**, resulting in clean aluminium surface, which is readily oxidized by some dissolved oxygen. Also the **Methanol** can act as an oxidizer:



This reciprocal process effectively fuels corrosion until either the metal is eaten away or the concentration of CH₃OH is negligible. Concerns with **Methanol**'s corrosivity have been addressed by using **Methanol** compatible materials, and fuel additives that serve as corrosion inhibitors.

When produced from wood or other organic materials, the resulting organic **Methanol** (bioalcohol) has been suggested as renewable alternative to petroleum-based hydrocarbons. Low levels of **Methanol** can

be used in existing vehicles, with the use of proper cosolvents and corrosion inhibitors. The European Fuel Quality Directive allows up to 3 percent **Methanol** with an equal amount of cosolvent to be blended in gasoline sold in Europe. Today, China uses more than one billion gallons of **Methanol** per year as a transportation fuel in both low level blends in existing vehicles, and as high level blends in vehicles designed to accommodate the use of **Methanol** fuels.

Other applications

Methanol is a traditional denaturant for ethanol, thus giving the term "methylated spirit."

Methanol is also used as a solvent, and as an antifreeze in pipelines and windshield washer fluid.

In some wastewater treatment plants, a small amount of **Methanol** is added to wastewater to provide a food source of carbon for the denitrifying bacteria, which convert nitrates to nitrogen to reduce the denitrification of sensitive aquifers.

During World War II, **Methanol** was used as a fuel in several German military rocket designs, under the name M-Stoff, and in a mixture as C-Stoff.

In the early 1900s, **Methanol** was used as an automobile coolant antifreeze.

Methanol is also a denaturing agent in polyacrylamide gel electrophoresis.

Direct-**Methanol** fuel cells are unique in their low temperature, atmospheric pressure operation, allowing them to be miniaturized to an unprecedented degree. Combined with the relatively easy and safe storage and handling of **Methanol**, this may open the possibility of fuel cell-powered consumer electronics, such as laptop computers and mobile phones.

Methanol is also widely used as fuel in camping and boating stoves. **Methanol** burns well in unpressurized burners. Alcohol stoves often require little more than a cup to hold fuel. This lack of complexity makes them a favorite of hikers spending extended time in the wilderness.