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Comparative properties of fuels: diesel and gasoline

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DESCRIPTION

Hydrocarbon-based fuels such as gasoline, diesel, natural gas, and Liquefied Petroleum Gas (LPG) have traditionally been used as fuel in diesel and gasoline engines. This research classified hydrocarbon-based fuels such as alkanes (paraffins), naphthenes (cycloparaffins), alkenes (olefins), alkynes (acetylenes), and aromatics (benzene derivatives). Their molecular structure and properties have been thoroughly described. Furthermore, some of the important fuel properties of commonly used fossil-based fuels in internal combustion engines, such as gasoline and diesel, have been evaluated.Their physical and chemical properties were described and compared.

The octane and cetane numbers have a significant impact on the fuel ignition delay period and self-ignition temperature properties. As a result, the physical and chemical properties, advantages, and disadvantages of fossil-based fuels have been thoroughly explained and compared. Natural gas is a colorless, odourless, and tasteless gas mixture containing methane, ethane, propane, pentane, and hexane. Natural gas contain trace amounts of carbon dioxide, nitrogen, helium, and hydrogen sulphide gas (0.5% by volume). In general, this gas contains 70%-90% methane, 0%-20% ethane, and slightly less propane than ethane. Natural gas in the market is refined and separated from other gases before being used as nearly pure methane gas. Natural gas can be stored as compressed natural gas (CNG) at pressures ranging from 16 to 25 MPa, or as liquid natural gas at pressures ranging from 70 to 210 kPa and temperatures ranging from 160°C.

These methods allow natural gas to be stored and used as Compressed Natural Gas (CNG) in internal combustion engines with a single-point spray system. Because it provides a longer mixing time than is required for natural gas, the single-point spraying system allows for the most efficient use of natural gas. Biodiesel is a valuable alternative fuel that is produced through the transesterification of vegetable oils, animal fats, and recycled greases. Students prepared biodiesel in this experiment by base-catalyzed transesterification of several vegetable oils, which were then compared to conventional petroleum-based fuels to assess their physical properties and obtain a thermochemical profile. Diesel, gasoline, natural gas, and LPG are all fossil-based fuels that are commonly used in engines. However, depending on the thermodynamic cycles, internal combustion engines use different fuel types.

As a result, different properties of fuels can be demonstrated with one another. Gasoline fuels, for example, should have a high ignition resistance, whereas diesel fuels should be self-ignitable. For these reasons, hydrocarbon fuels can be converted using a chemical process or by improving fuel properties, depending on the engine type. Thus, by converting hydrocarbons to each other through some of the chemical processes, new fuel formulas or various fuel properties can be improved. Fuel additives can improve diesel and gasoline engine fuel properties such as cetane number, octane number, viscosity, and density. Alternative fuels are one of the most promising fuel additives for the future. Alcohols with high octane numbers and low density propensities improve fuel properties such as increasing the octane number of gasoline and decreasing the viscosity and density properties of diesel fuel. Furthermore, biodiesel, which has a high cetane number, can improve the diesel fuel cetane number.