

“Characterization of the Viscosity of Blends of Dimethyl Ether with Various Fuels and Additives”

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Diesel fuel combustion in an engine has negative effects on the environment which include thick smoke, combustion noise, and nitrogen oxide in the exhaust. Experimenting with dimethyl ether, DME, as a fuel source has shown positive feedback. When DME combusts, less combustion noise is involved and no harmful oxides are released into the environment. These results are most likely due to the high cetane number, a measure of ignition value, associated with DME. However, DME alone cannot be a fuel source in modern combustion engines due to its low viscosity and lack of lubricity to prevent engine wear. Finding an acceptable blend of DME with various fuels is the goal of this experiment. Various fuels and additives such as federal low-sulfur diesel fuel, soybean oil, biodiesel, and lubricity additives were studied to examine the effects of DME on the mixtures viscosity. A high-pressure capillary viscometer was needed in order to keep DME a liquid in the mixture. Using this viscometer, viscosity measurements were taken at pressures up to 3500 psig. None of the mixtures studied showed viscosity measurements above diesel fuel specifications for mixtures with more than 50% (by weight) DME.

Bibliography

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