

Overview of the oxygenated fuels in spark ignition engine: Environmental and performance

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ABSTRACT

Oxygenated fuels such as alcohols and ethers have the potential to provide reliable sources, and environmentally friendly fuel to world's increasing future energy demands. Oxygenated fuels have a promised future since are renewable and produced from several sources, also can be produced locally. The first objective of this paper is to systematically review of oxygenated fuels including alcohol and ether regarding the production, environmental impacts and potential using as octane booster of gasoline that used in spark ignition (SI) engine. Another objective of this paper is to review the effects of oxygenated fuels on performances and emissions characteristics of spark ignition engine. Alcohol and ether burn very cleanly than regular gasoline and produce lesser carbon monoxide (CO) and nitrogen oxides (NO_x). Mainly the ether fuels (methyl tertiary butyl ether MTBE and Dimethyl EtherDME) are used as additives at low blending ratio to enhance the octane number and oxygen content of gasoline. Furthermore, alcohols and ethers have significant impacts on the environment, greenhouse gas and human health. In addition to this, application of oxygenated fuel on SI engines can decrease environmental pollution, strengthen agricultural economy and decrease gasoline fuel requirements. The increase in engine performance could be attained with an increased compression ratio along with the use of alcohol fuels which have a higher-octane value. Overall, oxygenated fuels have been found to be a very promising alternative fuel for SI engines, capable of providing high thermal efficiency, and lower NO_x levels.

KEYWORDS:

Alcohols fuel; MTBE; Spark ignition engine; Engine emissions; Oxygenated fuel