

Characterization and Effect of Using Pumpkin Seeds Oil Methyl Ester (PSME) as Fuel in a LHR Diesel Engine

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Abstract : In order to decrease the hazardous emissions of the internal combustion engines and to improve the combustion and thermal efficiency, thermal barrier coatings are applied. In this experimental study, cylinder, piston, exhaust, and inlet valves which are combustion chamber components have been coated with a ceramic material, and this earned the engine LHR feature. Cylinder, exhaust and inlet valves of the diesel engine used in the tests were coated with ekabor-2 commercial powder, which is a ceramic material, to a thickness of 50 μm , by using the boriding method. The piston of a diesel engine was coated in 300 μm thickness with bor-based powder by using plasma coating method. Pumpkin seeds oil methyl ester (PSME) was produced by the transesterification method. In addition, dimethoxymethane additive materials were used to improve the properties of diesel fuel, pumpkin seeds oil methyl ester (PSME) and its mixture. Dimethoxymethane was blended with test fuels, which was used as a pilot fuel, at the volumetric ratios of 4% and 8%. Due to thermal barrier coating, the diesel engine's CO, HC, and smoke density values decreased; but, NO_x and exhaust gas temperature (EGT) increased.

Keywords : boriding, diesel engine, exhaust emission, thermal barrier coating

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