

عنوان مقاله:

Performance Evaluation of a Thermal Barrier-coated CI Engine using Waste Oil Biodiesel Blends

محل انتشار:

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خلاصه مقاله:

Recycling plastics into energy sources is the most promising method for cutting down on pollution and trash. In this regard, predictions of adiabatic engines using pistons with thermal barrier coatings (TBCs) were made to reduce in-cylinder heat rejection, safeguard the underlying metallic surfaces from thermal cracking, and indeed reduce engine emissions. This study compares the predicted thermal and physical parameters of Plastic Waste Oil (WP) with its diesel blends in fixed proportions of WP₁₀D₉₀ (10% plastic oil, 90% diesel), WP₂₀D₈₀, WP₃₀D₇₀, WP₄₀D₆₀, and WP₅₀D₅₀ to diesel values. The study further explores the concept of the utility function to evaluate the best-ranked fuel blend in each category of various performance characteristics namely BTE, BSFC, UHC, CO, and NO_x. Additionally, the effect of the thermal barrier piston coating on CI engine performance metrics and emissions was studied and compared to those achieved with regular diesel oil. When compared to diesel, the results state that the WP₄₀D₆₀ blend has the highest brake thermal efficiency, i.e., 31.62% at 80% load, and the lowest NO_x emissions at all load conditions. In addition, it was further observed that the WP₂₀D₈₀ has lower hydrocarbon (HC) emissions at 20% load and an increment in CO emissions for all blends and load combinations. Overall, WP₃₀D₇₀ has come up with the .best fuel as per the Utility function

کلمات کلیدی:

Biodiesel blends, Brake thermal efficiency, Specific fuel consumption, Gas analyzer, Utility function

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