Research Article

Investigation of the environmental implications of using cerium oxide nano-additives in gasoline engines fueled with gasoline-oxyhydrogen

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ABSTRACT

This research aims to study the impact of incorporating cerium oxide nanoparticles into gasoline, along with oxyhydrogen injection. The engine performance and exhaust emission characteristics were analyzed in this study. The addition of nano-additives and oxyhydrogen has been found to enhance combustion characteristics by increasing the thermo-physical properties of the fuel. Cerium oxide at 25 ppm and 50 ppm enhances the engine's thermal efficiency by 6.9–10.2% and 12–18.1%, respectively, and significantly reduces fuel consumption by 3.3–18.8% and 13.3–18.7%, respectively, compared to base gasoline on a volumetric scale. Furthermore, cerium oxide at 25 ppm and 50 ppm has been shown to potentially reduce carbon

KEYWORDS:

Cerium oxide environmental impact gasoline engine nano-additives oxyhydrogen

Abbreviations

BTE	=	Brake Thermal Efficiency
CeO_2	=	Cerium Oxide
CI	=	Compression Ignition Engines
CO	=	Carbon monoxide
CO_2	=	Carbon Dioxide
DOE	=	Design of Experiments
E	=	Ethanol

G + HHO + 50CeO	=	100% Gasoline + 50 ppm of cerium oxide +0.20 kg/hr oxyhydrogen
G + HHO	=	100% Gasoline +0.20 kg/hr oxyhydrogen
G	=	Gasoline
H_2O	=	Water
HC	=	Hydrocarbon
HHO	=	Oxyhydrogen
HWI	=	Heated Water Injection
NOx	=	Nitrogen Oxides
ppm	=	parts per million

SI	=	Spark Ignition Engines

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