

- Specific fuel consumption is decreased by 0.5 kg/kw.hr for diesel mixed with cerium oxide at 30 ppm.
- Mechanical efficiency of the engine is enhanced by 20% while using fuel added with 30 ppm cerium oxide.
- However thermal efficiencies are higher for neat diesel than the fuel mixed with nanoparticle.
- There is a significant improvement in the exhaust emissions while using diesel mixed with cerium oxide nanoparticle.

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6. Nomenclature

Sfc	Specific Fuel Consumption
D+CERIA10PPM	Diesel + Cerium oxide nanoparticles of 10ppm
D+CERIA20PPM	Diesel + Cerium oxide nanoparticles of 20ppm
D+CERIA30PPM	Diesel + Cerium oxide nanoparticles of 30ppm
D+CERIA40PPM	Diesel + Cerium oxide nanoparticles of 40ppm
Bp	Brake Power

References

- [1] Heejung Jung, David B. Kittelson, Michael R. Zachariah ((2005)) The influence of a cerium additive on ultrafine diesel particle emissions and kinetics of oxidation, Elsevier Journal of Combustion and Flame 142, 276–288.
- [2] Yanan Gan, Li Qiao (2011) Combustion characteristics of fuel droplets with addition of nano and micron-sized aluminum particles, journal of Combustion and Flame 158 (2011) 354–368.
- [3] V. Arul Mozhi Selvan, R. B. Anand and M. Udayakumar (2009) Effects Of Cerium Oxide Nanoparticle Addition In Diesel And Diesel-Biodiesel-Ethanol Blends On The Performance And Emission Characteristics Of A CI Engine, ARPN Journal of Engineering and Applied Sciences, VOL. 4, NO. 7.
- [4] Ajin C. Sajeevan and V. Sajith (2012) Diesel Engine Emission Reduction Using Catalytic Nanoparticles: An Experimental Investigation, Journal of Engineering. Volume 2013, Article ID 589382, 9 pages.
- [5] Stephen W. Chung a, Elena A. Guliants b, Christopher E. Bunkeret al.(2011) Size-dependent nanoparticle reaction enthalpy: Oxidation of aluminum nanoparticles, Journal of Physics and Chemistry of Solids 72, 719–724.
- [6] Ranaware A. A.1, Satpute S. T. (2008) Correlation between Effects of Cerium Oxide Nanoparticles and Ferrofluid on the Performance and Emission Characteristics of a C.I. Engine, IOSR Journal of Mechanical and Civil Engineering. 2278-1684, PP: 55-59.
- [7] A.Selvaganapthy, A.Sundar, B.Kumaragurubaran, P.Gopal (2012) An Experimental Investigation to Study the Effects of Various Nano Particles with Diesel on Di Diesel Engine, ARPN Journal of Science and Technology VOL. 3, NO. 1.
- [8] Suthar Dinesh Kumar L.a, Dr. Rathod Pravin P.b, Prof. Patel Nikul K (2012) Performance And Emission By Effect Of Fuel Additives For Ci Engine Fuelled With Blend Of Biodiesel And Diesel - A Review Study, Ben-Gurion Journal of Engineering Research and Studies.
- [9] Exhaust gas composition measurements Orsat gas analyzer, (2011) Division of Thermodynamics, Institute of Heat Engineering. Thermodynamics II – Laboratory Instructions Exercise No 8.
- [10] Akira Numata, Takuya Kumagai, Yoshinori Nagae, Shinnosuke Osafune. (2001) Increase of Thermal Efficiency and Reduction of NOx Emissions in DI Diesel Engines, Mitsubishi Heavy Industries, Ltd. Technical Review Vol.38 No.3.
- [11] Will Soutter (2011)Nanoparticles as Fuel Additives, <http://www.azonano.com/article.aspx?ArticleID=3085P>.