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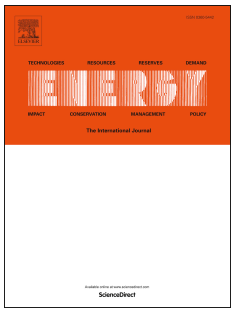


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PII: S0360-5442(17)30789-2

DOI: 10.1016/j.energy.2017.05.032

Reference: EGY 10839

To appear in: *Energy*

Received Date: 22 November 2016

Revised Date: 3 May 2017

Accepted Date: 5 May 2017

Please cite this article as: Balamurugan S, Sajith V, Experimental investigation on the stability and abrasive action of cerium oxide nanoparticles dispersed diesel, *Energy* (2017), doi: 10.1016/j.energy.2017.05.032.

# Experimental investigation on the stability and abrasive action of cerium oxide nanoparticles dispersed diesel

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**ABSTRACT**

Ceria nanoparticle is a well-known fuel borne additive for reducing the particulate emissions from diesel engines. Main challenges in the use of ceria nanoparticles are the lack of long-term dispersion stability in diesel and their effect on lubricity of diesel. The present work mainly focuses on synthesis of stable ceria nanoparticle diesel suspension and study on their lubricity. Ceria nanoparticles were synthesized by co-precipitation method and nano fluids were prepared by two-step method. The optimum concentration of oleic acid (surfactant) was determined based on critical micelle concentration studies and concentration of ceria nanoparticle in diesel was varied from 5 to 25 ppm. Long term dispersion stability studies using Dynamic light scattering system and Turbidity meter shows 10 ppm as an optimum concentration of ceria nanoparticle in diesel for maximum stability.Tribological properties of modified diesel were studied by a standard pin on disk apparatus. The wear rate was found to be reduced for all the nano additive concentrations in diesel and was least for 15 ppm. Based on studies conducted, 10 ppm is reported as an optimum concentration of nanoparticle in diesel having both enhanced stability and lubricity as compared to other concentration of ceria nanoparticles in diesel.

*Keywords:* Cerium oxide nano additives, CMC, Diesel, Long term stability, Pin on disk