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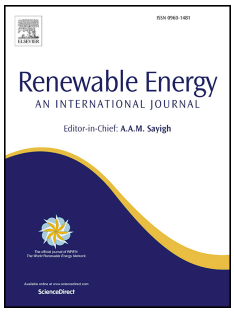

Novel environmentally friendly fuel: The effects of nanographene oxide additives on the performance and emission characteristics of diesel engines fuelled with *Ailanthus altissima* biodiesel

S.S. Hoseini, G. Najafi, B. Ghobadian, R. Mamat, M.T. Ebadi, T. Yusaf

PII: S0960-1481(18)30256-8

DOI: 10.1016/j.renene.2018.02.104

Reference: RENE 9835

To appear in: *Renewable Energy*

Received Date: 9 October 2017

Revised Date: 13 February 2018

Accepted Date: 21 February 2018

Please cite this article as: Hoseini SS, Najafi G, Ghobadian B, Mamat R, Ebadi MT, Yusaf T, Novel environmentally friendly fuel: The effects of nanographene oxide additives on the performance and emission characteristics of diesel engines fuelled with *Ailanthus altissima* biodiesel, *Renewable Energy* (2018), doi: 10.1016/j.renene.2018.02.104.

Novel environmentally friendly fuel: The effects of nanographene oxide additives on the performance and emission characteristics of diesel engines fuelled with *Ailanthus altissima* biodiesel

S.S. Hoseini[1], G. Najafi*[1], B. Ghobadian[1], R. Mamat[2], M. T. Ebadi[1] and T. Yusaf[3]

[1]Tarbiat Modares University, Tehran, Iran

[2]Universiti Malaysia Pahang, Malaysia

[3]University of Southern Queensland, Australia

* Corresponding author: g.najafi@modares.ac.ir, Tel.: +982148292322, fax: +982148292200

Abstract

The present study investigated the effect of graphene oxide (GO) nanoparticles, as novel fuel additives, on the engine performance and emission characteristics of a diesel engine. The GO nanoparticles were mixed with B0, B10, and B20 *Ailanthus altissima* biodiesel blends. The graphene oxide nanoparticles, at concentrations of 30, 60, and 90 ppm, were dispersed into each fuel blend by ultrasonication. Throughout this study, engine testing was performed at a constant speed of 2100 rpm and loads of 0%, 25%, 50%, 75%, and 100%. Performance and emission characteristics, including power, torque, specific fuel consumption (SFC), exhaust gas temperature (EGT), and CO, CO_2, unburned-hydrocarbon (UHC), and NOx emissions, were investigated. study revealed that, under the same conditions, most performance characteristics, such as power, torque, and EGT, significantly increased through the addition of GO to fuel blends, while SFC significantly decreased. The GO-nanoparticle additives facilitated significant reductions in CO and UHC emissions (approximately 7–20% and 15–28%, respectively); however, under the same conditions, slight increases in CO_2 and NOx emissions (approximately 6–10% and 5–8%, respectively) were observed. On the basis of the experimental results, we