

Alternative to aviation fuel based on an oxygenated nanofluid

November 7 2022, by David Bradley



Credit: Pixabay/CC0 Public Domain

Aviation is a big user of fossil fuels and, as such, is a heavy producer of carbon emissions. Sustainability is high on the agenda. New work in the *International Journal of Sustainable Aviation* has reviewed the thermo-physical properties of an alternative to aviation fuel based on an oxygenated nanofluid.

Selçuk Sarıkoç of the Department of Mechanical Engineering at Amasya University in Turkey, and Nwabueze Emekwuru of the School of Mechanical, Aerospace, and Automotive Engineering at Coventry University, Coventry, United Kingdom, point out that oxygen additives make for a leaner burn in [internal combustion engines](#) and reduce pollution. The additives ensure complete and efficient combustion of the fuel. They point out that additives in the form of nanoparticles of metal and non-metal oxides can improve the combustion processes still further. Alumina, zinc oxide, titania, ceria, and silica have all been investigated as nanoparticle additives for fuels.

The team's survey of the state-of-the-art in nanofluid-based aviation fuels reveals that oxygenated additives, such as alcohol and metal oxide nanoparticles improve the thermal and physical properties of fuels even boosting total calorific value of the fuel, accelerating the combustion process, and reducing soot formation through cleaner burning of the fuel. Overall engine performance is improved with such additives. The presence of oxygen within the fuel itself contributes significantly to the improvement in combustion.

However, the team also points out that the presence of the nanoparticles leads to better heat transfer and their [high surface area](#) to volume ratio allows for more effective interaction between oxygen and the fuel molecules to boost the combustion reactions at high altitude through a catalytic effect.

Improvements in engine performance are always welcome in aviation. Such improvements can effectively boost useful load-carrying capacity, extend flight range, allow higher altitude flying, and improve fuel economy.

More information: Nwabueze Emekwuru et al, A case for oxygenated nanofluid fuels as alternative aviation fuels: thermo-physical properties

and effects on engine performance, *International Journal of Sustainable Aviation* (2022). [DOI: 10.1504/IJSA.2022.10048693](https://doi.org/10.1504/IJSA.2022.10048693)

Provided by Inderscience

Citation: Alternative to aviation fuel based on an oxygenated nanofluid (2022, November 7) retrieved 26 April 2024 from <https://techxplore.com/news/2022-11-alternative-aviation-fuel-based-oxygenated.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.