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Investigation the impact of surfactant on the stability of nanofluids in the presence of aluminium oxide as an additive in ignition engines

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Nanotechnology refers to the ability to manipulate, measure, produce, and fabricate particles within the range of 1-100 nanometers in size [1]. The study of materials and their properties is a fundamental aspect of many academic disciplines. Nanotechnology is a field of study that encompasses various disciplines, such as toxicology, medicine, physics, chemistry, biology, mechanics, and engineering, among others. It is an interdisciplinary area of knowledge [2].

The proper implementation of physical and chemical techniques for achieving uniform dispersion of nanoparticles in base fuels and preventing agglomeration is a crucial aspect in the context of ignition (CI) engines. A dual-stage methodology was employed in the production of nano-additive fuels. Initially, the production of nanoparticles involved the utilisation of surfactants to facilitate the separation of particles, minimise agglomeration, and enhance the chemical stabilisation of the suspension. The steric stabilisation mechanism is responsible for the ability of surfactants to stabilise suspensions, which is a noteworthy observation [3].

In this study, ϒ-Al_2O_3 nanoparticles was used as the additive for reducing the ignition delay time in the present of the Dimethylaminoethyl azide (DMAZ), and then the effects of surfactant on droplet burning rate are discussed.Therefore sorbitan monooleate(sp-80), sorbitan trioleate (sp-20), Polysorbate 80(tween-80), poly ethylene Glycol-200 (KEPEG 200), polysorbate 60 (tween-60=KEPS 60), polysorbate 20 (tween-20=KEPS 20), Cetyl Trimethyl Ammonium Bromide (CTAB), and combinations of these surfactants were examind. the obtaind results confirm tween-20 ,tween-60, and CTAB have accaptale efficency.

Keywords: Surfactant , Tween, ϒ-Al_2O_3, Nanoparticles.

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