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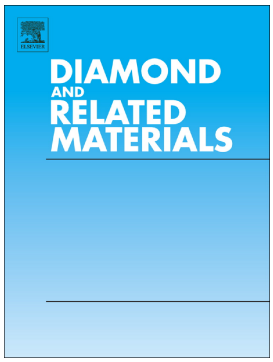

Carbon nanotubes of oil fly ash integrated with ultrathin CuO nanosheets as effective lubricant additives

Numan Salah, Ahmed Alshahrie, M.Sh. Abdel-wahab, Najlaa D. Alharbi, Zishan H. Khan

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ACCEPTED MANUSCRIPT

Carbon nanotubes of oil fly ash integrated with ultrathin CuO nanosheets as effective lubricant additives

Numan Salah,[a,*] Ahmed Alshahrie,[a,b] M. Sh. Abdel-wahab,[a] Najlaa D. Alharbi,[c] Zishan H. Khan[d]

[a]Centre of Nanotechnology, King Abdulaziz University, Jeddah 21589, Saudi Arabia.
[b]Dept. Phys., Faculty of Science, King Abdulaziz University, Jeddah 21589, Saudi Arabia.
[c]Dept. Phys., Sciences Faculty for Girls, King Abdulaziz University, Jeddah 21589, Saudi Arabia
[d]Department of Applied Sciences and Humanities, Jamia Millia Islamia, New Delhi 110025, India.
*Email: nsalah@kau.edu.sa; alnumany@yahoo.com

ABSTRACT

Carbon nanomaterials have been reported to be effective as lubricant additives. Amongst them carbon nanotubes (CNTs) produced from oil fly ash, were found to have excellent tribological properties. In this work these CNTs were further improved for their suspension and tribological performance by integrating them with ultrathin non-agglomerated CuO nanosheets produced by the microwave technique. The mixture of these nanostructures was evaluated as a lubricant oil additive to reduce the friction between two metallic surfaces. The ball-on-disk tribometer was used to measure the frication coefficient. Samples with different concentrations of this mixture in the range 0 - 0.2 wt% were evaluated as lubricant additives for the base sunflower oil. The obtained results were compared with those of commercial well-known carbon nanostructures like single wall nanotubes, multiwall nanotubes and graphene. The results of fly ash CNTs integrated with CuO nanosheets were found to be superior as they could significantly reduce value of the friction coefficient by approximately 43%. The suspension with very small concentration i.e. 0.05 wt% could stay for months without showing any precipitation. These results suggest that the mixture of fly ash CNTs and CuO nanosheets is ideal lubricant additives and may be used for variety of lubricants.

Keywords

Lubricant additives; Friction coefficient; CNTs of oil fly ash; CuO nanosheets; Nanolubricants.

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