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# Microwave-assisted exfoliated graphite-derived layered nanographene sheets as anti-wear and anti-friction additive in engine oil

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**Abstract:**

Nanographene sheets (NGS) with few layers were prepared from microwave-assisted exfoliated graphite via shear mixing using all-purpose kitchen mixer.Transmisson electron micrographs (TEM) and Raman spectrum revealed that majority of NGS consist of few layers ranging from 5 to 10 layers. NGS are highly crystalline in nature demonstrating lucid distinguishable edges of graphene in TEM. These NGS were used as an additive in multigrade lubricating oil, and the wear and frictional tests are performed to observe the effective role of nanoadditive. Nanolubricant with NGS and reference oil showed specific wear rate of 0.0112 $\times 10^{-7}$ $mm^2/N$ and 3.461 $\times 10^{-7}$ $mm^2/N$, respectively. Noteworthy reduction in specific wear rate is ascribed to formation of a protective tribo film on the metal surfaces by NGS preventing the asperities from meeting eventually reduces friction and wear.

***Keywords****: Nanographene sheets, Microwave-assisted exfoliation, Nano lubrication, Tribo-film, Wear*

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