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**Properties and tribological evaluation of graphene and fullerene nanoparticles as additives in oil lubrication**

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**Abstract**
In this study, SAE-0W20 engine oil was mixed with graphene and fullerene nanoparticles. The goal of this study was to evaluate and compare the effects of different carbon nanoparticles on the thermal, rheological, and tribological properties of engine oil, such as thermal degradation, viscosity, friction, and wear. Using a two-step process, graphene and fullerene nanostructures were dispersed in low-viscosity SAE-0W20 engine oil at a concentration of 0.05 wt.%. The friction and wear characteristics were evaluated in a customized cylindrical block-on-ring tribology test according to the ASTM G77 standard. Graphene and fullerene nanoparticles protect contact surfaces by forming a very thin protective film between moving mechanical parts thus resulting in wear and friction reduction. The results showed graphene nanoparticles have improved significantly the tribological performance of SAE-0W20 engine oil. © IMechE 2023.

**Author Keywords**
frictional heat; fullerene; Graphene; nanoparticle additive; oil lubrication

**Index Keywords**
Engines, Friction, Graphene, Lubricating oils, Nanoparticles, Petroleum additives, Tribology, Viscosity, Wear of materials; Carbon nanoparticles, Engine oil, Frictional heat, Fullerene nanoparticles, Nanoparticles additives, Oil lubrication, Property evaluation, Rheological property, Thermal, Tribological evaluations; Fullerenes

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