

Tribological Performance Effect of SiO₂ and TiO₂ Nanoparticles as Lubricating Oil Additives



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Abstract Friction is one of major concern in mechanical movement while the lubricant is one of solution to counter it. The additive of nanoparticles in lubricant may improve its tribological performance. The current study focusses on the effect of SiO₂ and TiO₂ nanoparticles as additive in PVE lubricant. The new solution namely nanolubricant was prepared at three different concentrations. The nanolubricants were characterized using TEM and its stability was evaluated up to 30 days. Four-ball method was used to determine the effect of nanoparticle concentration on coefficient of friction (COF) and wear scar diameter (WSD). The results reveal that nanoparticle additive provide better COF at low volume concentration. The COF for nanolubricant at volume concentration less than 0.010% for TiO₂ and less than 0.005% for SiO₂ attained lower than pure PVE lubricant. The results for WSD also were in agreement with the trend of COF. Therefore, the nanolubricant has potential to provide better friction coefficient performance for lubrication application.

Keywords Nanolubricant · Tribology · Coefficient of friction · Wear scar diameter · Four-ball test

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