

Nanodiamond-based nanolubricant

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Recently, certain nanomaterials in powder and colloidal forms have emerged as potential anti-friction and wear additives to a variety of base lubricants. Highly purified detonation nanodiamonds (DND) with small aggregate sizes are a relatively new nanomaterial additive [1, 2]. In the current work, we report results of the comparative analysis of the colloidal stability and tribological performance of DND-based additives as well as other commercial additives based on detonation soot, boron nitride and PTFE particles, oil soluble molybdenum compounds and their combinations in PAO-6 and mineral engine oil 15W40 (API CF/CC).

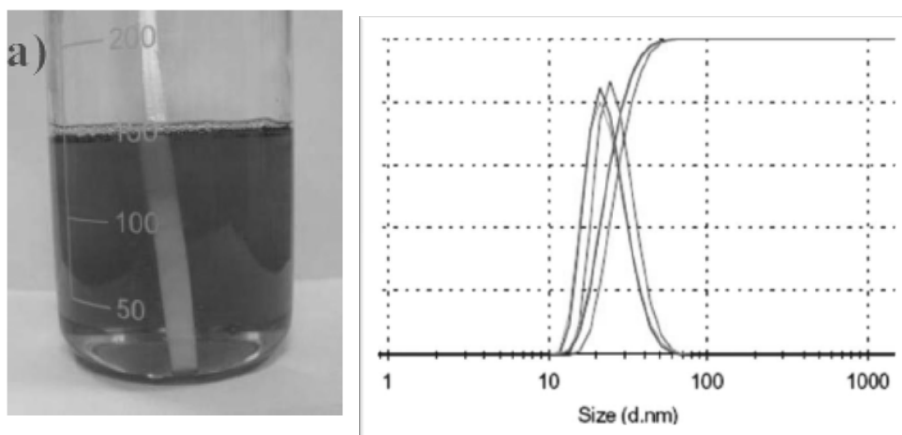


Figure 1. Photographs of colloidal suspension of 0.1% 10nm DND (10nm when dispersed in DI water) in PAO-6 oil (a) and volumetric size distribution of DND shown in PAO-6 oil (from [2]).

Testing has been performed on these formulations using ring-on-ring (friction coefficient) and four ball tests (extreme pressure (EP) failure load and diameter of wear spot). Effects of different parameters of the formulations on their tribological properties will be discussed.

- [1] M.G. Ivanov, S.V. Pavlyshko, D.M. Ivanov, I. Petrov, G. McGuire, and O. Shenderova, *Mater. Res. Soc. Symp. Proc.* **1203**, 1203-J17-16 (2010).
- [2] M.G. Ivanov, S.V. Pavlyshko, D.M. Ivanov, I. Petrov, and O. Shenderova, *JVST. B* **28**(4), 869 (2010).