

# Tribological Properties of Cyano-Based Ionic Liquids as Lubricant Additives

## CATEGORY OR KEYWORDS

Novel lubricating fluids and additives, Lubricant chemistry, Ionic liquids, Lubricant additives

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## INTRODUCTION

Lubricant additives are often used in many mechanical parts. From the viewpoint of environmental protection, the using of lubricant additives with low environmental impact is demanded. This investigation focused on ionic liquids (ILs) as green lubricant additives. Ionic liquids are salts consisting of cation and anion that exist as liquid phase at room temperature. They have been used as novel lubricants, because of their attractive properties, such as low vapor pressure, high thermal stability, and high oxidation stability [1]. They actually exhibit high tribological properties. Moreover, these properties can be controlled by changing the ion pairs. Thereby, solubility against base oils is able to enhance. It is well known that trihexyl(tetradecyl)phosphonium cation achieve high solubility [2]. This investigation evaluated tribological properties of IL, which consist of this cation and cyano-based anion.

## RESULTS

In this study, trihexyl(tetradecyl)phosphonium dicyanoamide ([P6,6,6,14][DCN]) and dioctyl sebacate (DOS) were used as lubricant additive and base oil, respectively. The sliding test were conducted using of SRV4. The lubricants used were DOS, DOS containing IL with 1.0 mass%. Figure 1 shows the results of neat DOS. DOS caused seizure under 150°C. On the other hand, DOS+IL in Fig. 2 shows the stable behavior under 150°C. These results indicate that the lubricating effect of IL was expressed. In addition, IL exhibited wear resistance under all surrounding temperature.

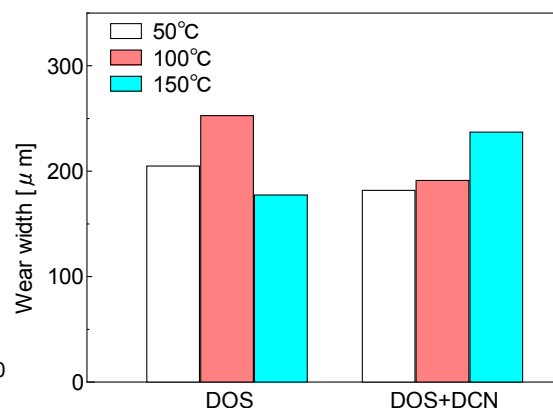
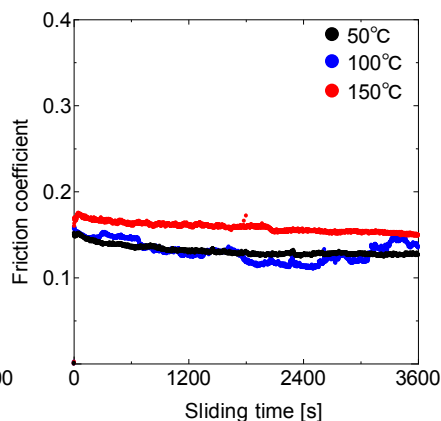
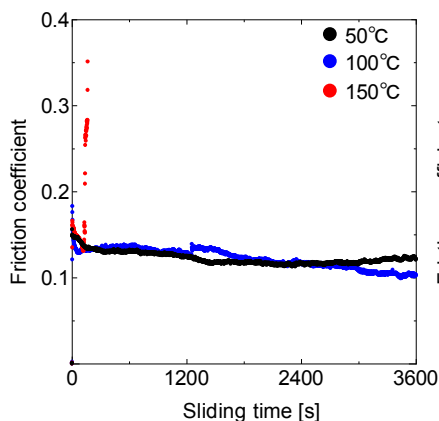


Fig. 1 Friction behavior of DOS

Fig. 2 Friction behavior of DOS+IL

Fig. 3 Wear volume

## REFERENCES

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