Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A

Supporting Information

on

Ultrasound Assisted Shape Regulation of CuO Nanorods in Ionic Liquids and Their Use as Energy Efficient Lubricant Additive

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Figure S1

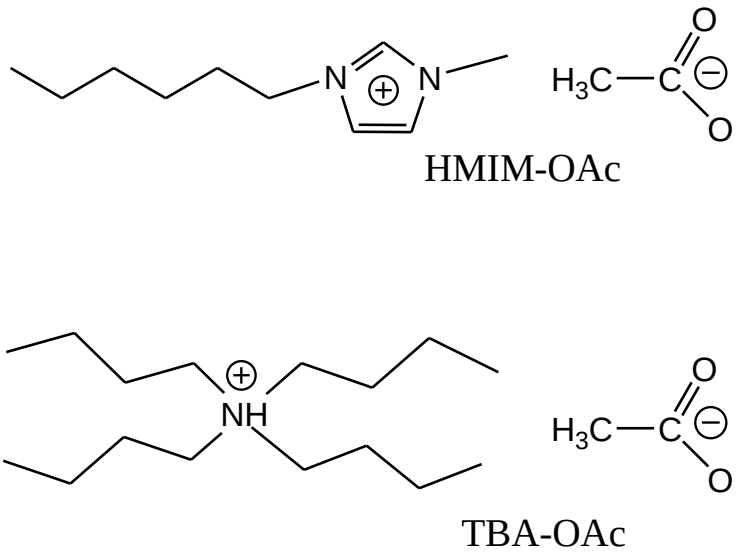

Figure S1. Molecular structure of 1-Hexyl-3-methylimidazolium acetate (HMIM-OAc) and tetrabutylammonium acetate (TBA-OAc) ionic liquids used for morphological reshaping of CuO nanorods.

Figure S2

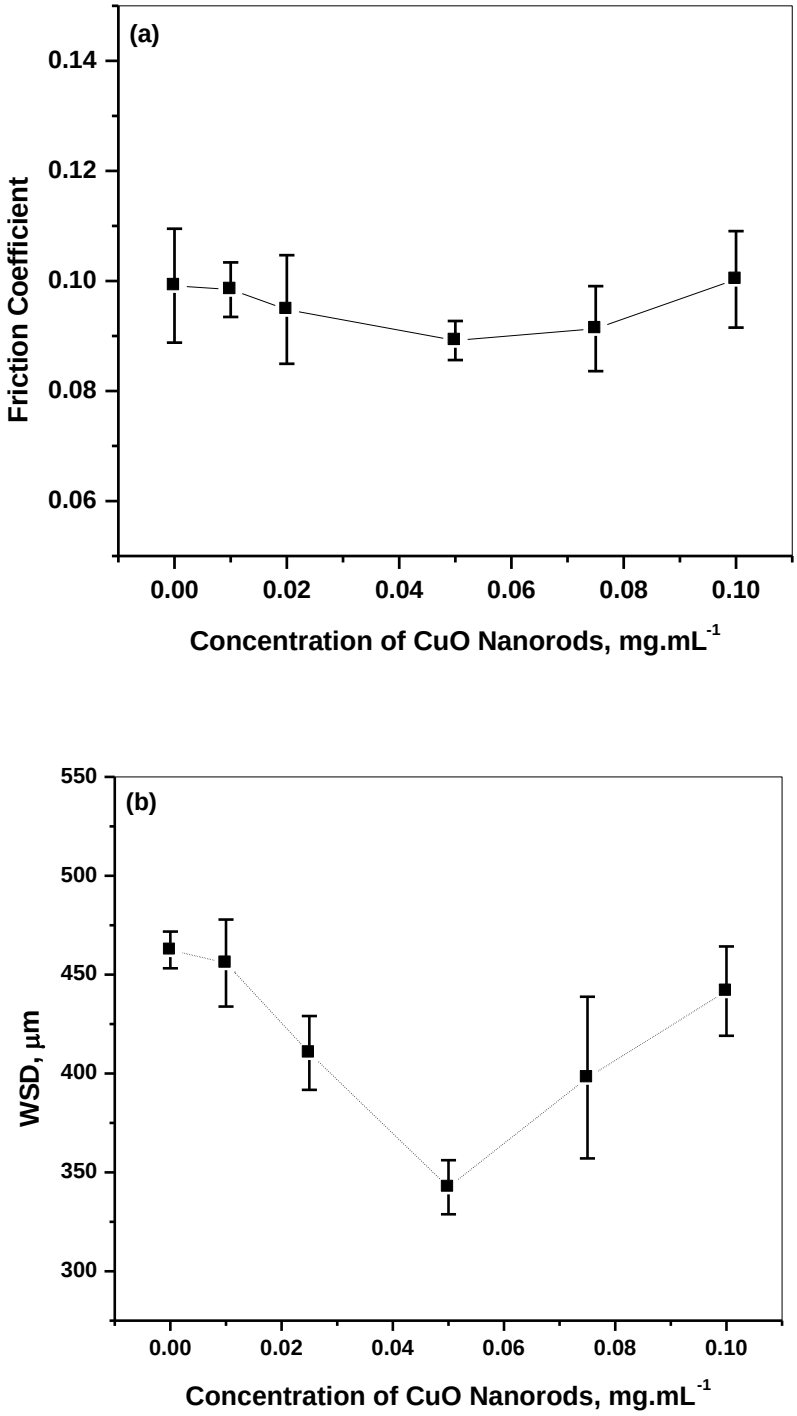

Figure S2. Changes in (a) friction coefficient and (b) wear scar diameter (WSD) with function of $CuONR_2$ concentration in 10W-40 commercial oil. Load: 392 N, temperature: 75 °C, rotating speed: 1200 rpm, test duration: one hour.

Figure S3

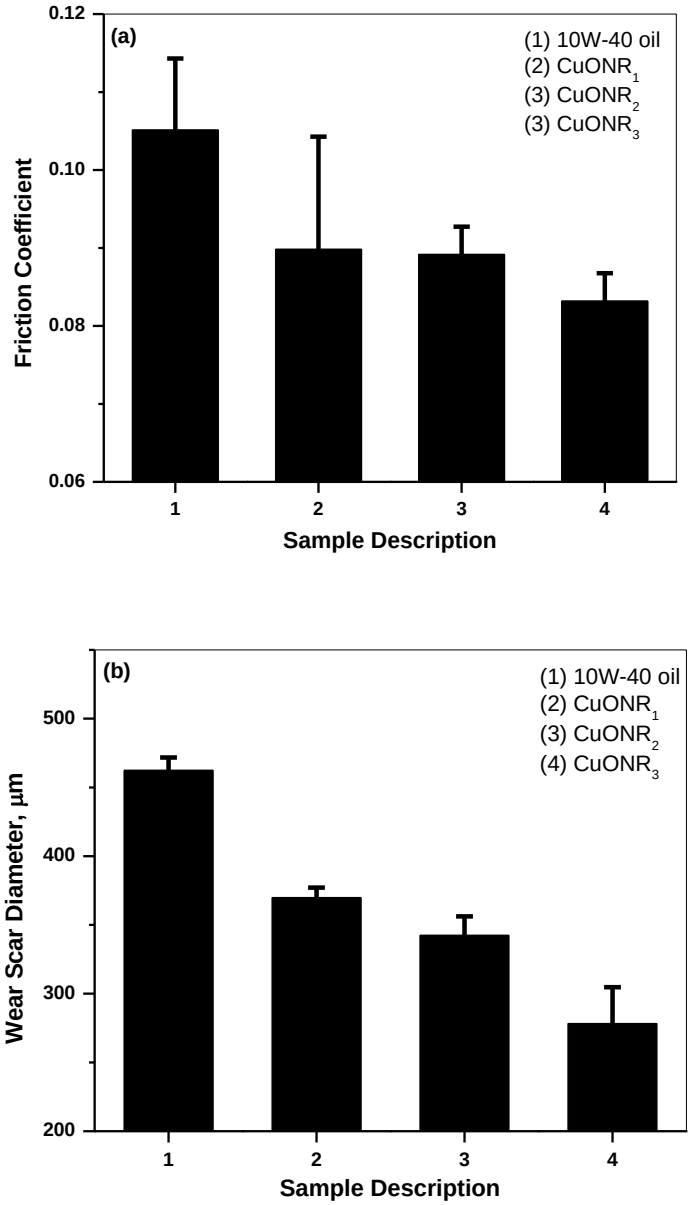

Figure S3. Tribological characteristics (a) friction coefficient and (b) wear scar diameter of CuO nanorods ($CuONR_1$, $CuONR_2$ and $CuONR_3$) blended with 10W-40 commercial oil. Load: 392 N, rotating speed: 1200 rpm, temperature: 75 °C, test duration: 1 hour, concentration: 0.05 $mg.mL^{-1}$. The plotted friction coefficient values are calculated considering friction coefficient between 10 to 60 minutes and provided error bar is standard deviation of these values. We have exclude first 10 minutes friction coefficient considering running-in conditions. The wear scar diameter values are based on measurement of worn area on three different ball and provided error bas is standard deviation of these values.

Figure S4

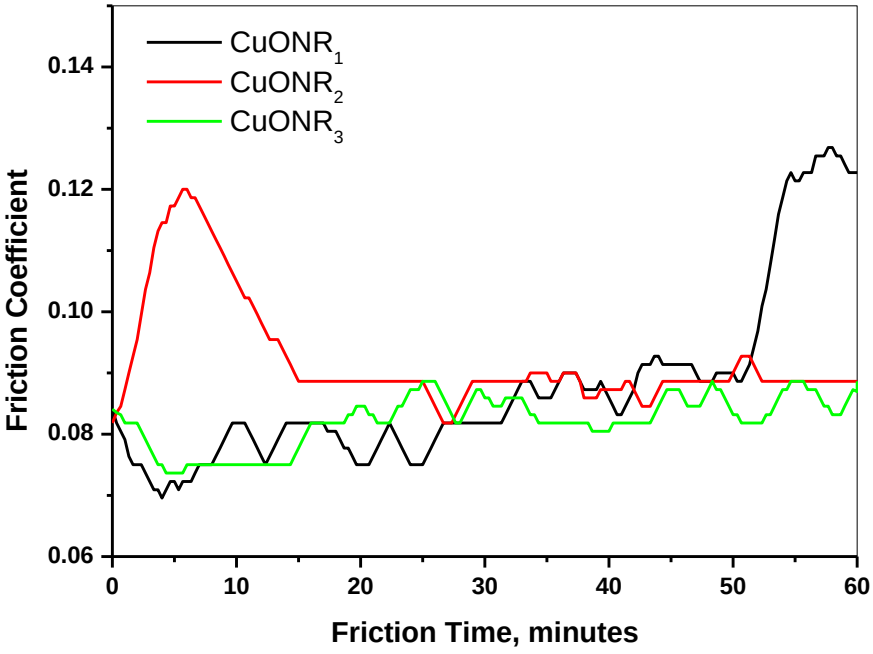

Figure S4: Changes in friction coefficient versus time for CuO nanorods ($CuONR_1$, $CuONR_2$ and $CuONR_3$) blended with 10W-40 commercial oil: Load: 392 N, rotating speed: 1200 rpm temperature: 75 °C, CuO nanorods concentration: 0.05 $mg.mL^{-1}$.

Figure S5

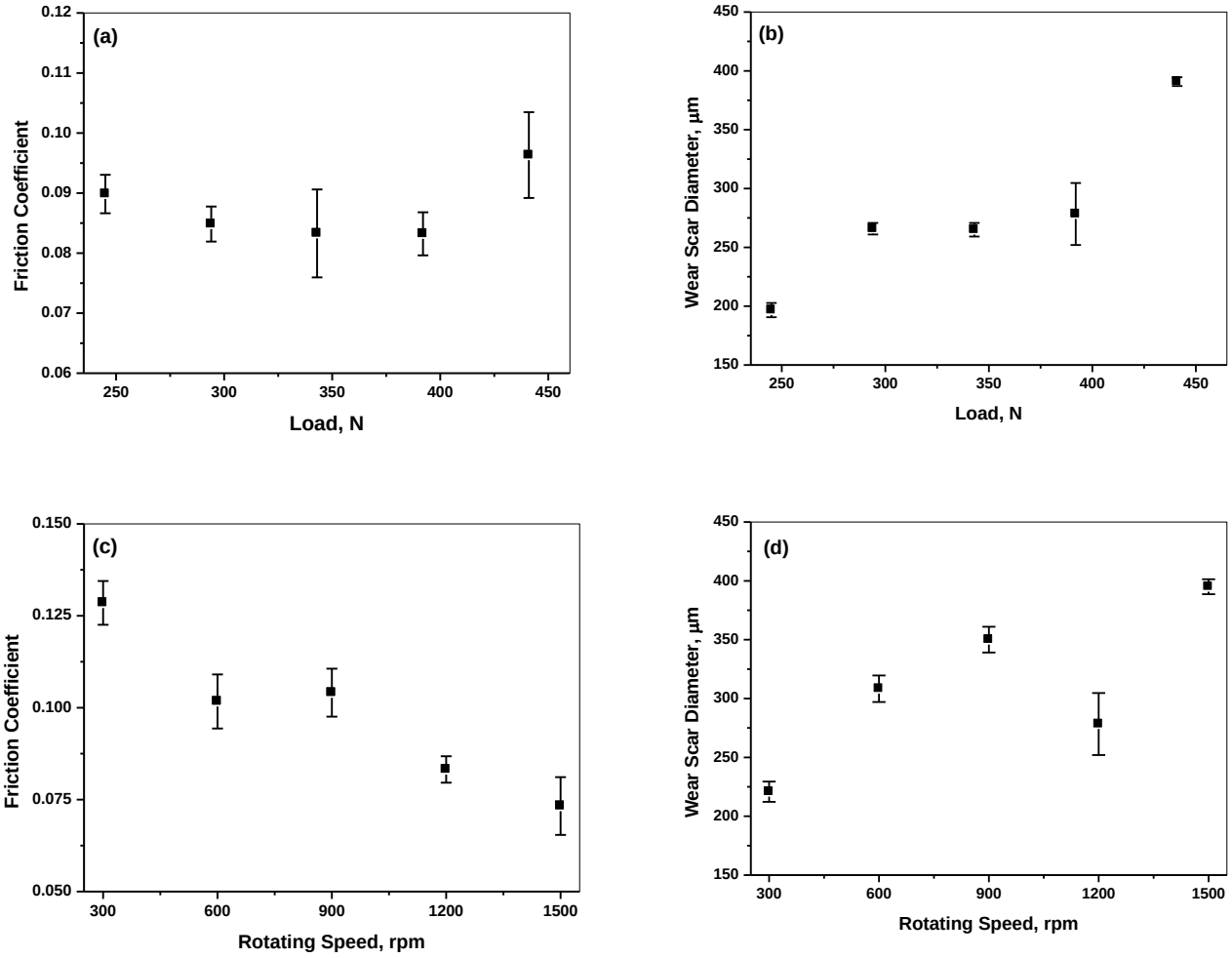

Figure S5. Tribological characteristics of $CuONR_3$ blended with 10W-40 commercial oil (concentration: 0.05 $mg.mL^{-1}$) with function of load and rotating speed at temperature of 75 °C for one hour. Changes in (a) friction coefficient and (b) wear scar diameter with function of load at rotating speed of 1200 rpm. Changes in (c) friction coefficient and (d) wear scar diameter with function of rotating speed at load of 392 N.

Figure S6

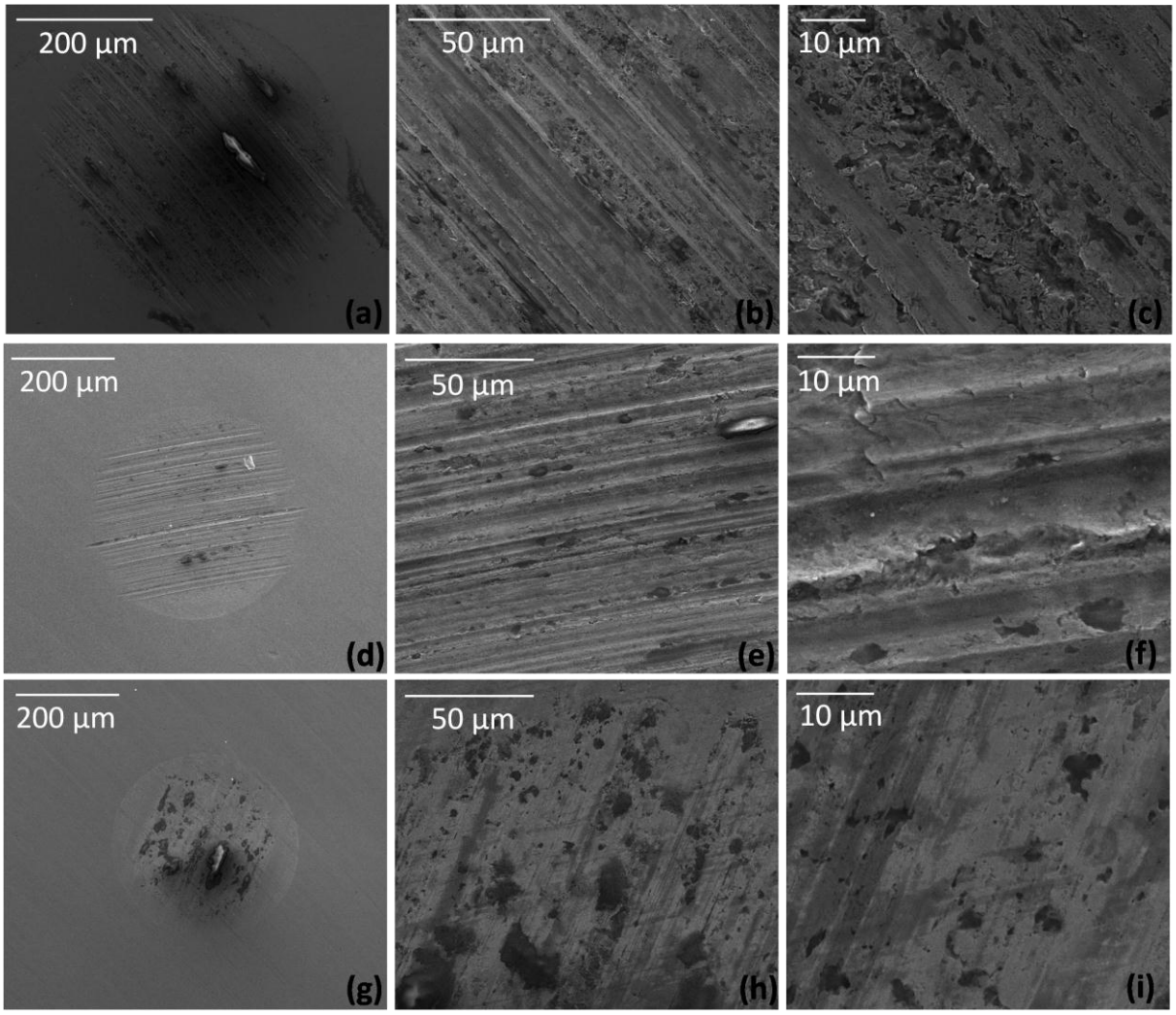

Figure S6. FESEM images of the worn surfaces on steel balls lubricated with (a-c) 10W-40 commercial oil, (d-f) $CuONR_2$ blended with 10W-40 oil and (g-i) $CuONR_3$ blended with 10W-40 oil. Load: 392 N, rotating speed: 1200 rpm, temperature: 75 °C, test duration: 1hour, Concentration of nanorods: 0.05 $mg.mL^{-1}$. Under each section images are shown from low to high resolutions.