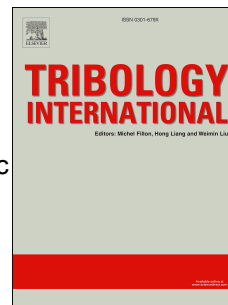


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Effect of cation nature on the lubricating and physicochemical properties of three ionic liquids.

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Abstract

In this work, the lubricating ability and physicochemical properties of three ionic liquids (ILs) containing the same anion and three different cations are studied. Steel-steel contact, lubricated with each IL was studied using a ball-on-flat reciprocating tribometer. The three ILs presented very similar values of thermal stability, density, and surface tension. Trihexyltetradecylammonium bis(trifluoromethylsulfonyl) amide showed the best wettability at 25°C, but the worst wettability at 100°C. The influence of the surface finish in the lubricating properties of the ILs were also investigated. Results show higher wear values for fine-finished surfaces. No significant differences in the tribological performance of the ILs are found at low frequency; however, tribo-attack of the imidazolium-based IL on steel, resulted in higher wear at 5 Hz.

Keywords: Ionic liquids, surface roughness, steel, lubricants, contact angle

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