

Recent results of the use of room-temperature ionic liquids in tribology

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ABSTRACT

The possibility of tailoring the physical and chemical properties of ionic liquids (ILs) by modifying their molecular features such as the nature of the cation and the anion size and composition, has open up the field of IL-lubrication [1-3] with low friction coefficients and wear rates under conditions for which the currently used lubricating fluids fail. The possible applications cover strategic technologies such as aerospace, microelectronics and nanotechnology.

The surface interactions of ILs have been studied in a variety of materials in sliding contact under variable conditions, both as neat lubricants and as additives. Of particular interest are the studies on lubrication of light and reactive metals such as magnesium, aluminium or titanium. In the case of fluorine or phosphorus-containing ILs, the formation of fluorides and phosphates at the contact surfaces is the determining wear mechanism step.

The ability of ILs molecules to interact with surfaces has also been explored in nanotechnology applications. New polymer/IL/nanoparticle and polymer/IL/carbon nanotube nanocomposites are being developed, where the size, morphology, distribution of the nanophases and tribological performance are controlled by the presence of ILs.

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