Title (4)	:	**Enhancing boundary friction and wear reduction through adsorption control in protic ionic liquid and carbon mixtures**
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Abstract	:	This study addresses the challenge of enhancing lubrication performance by exploring the potential of a protic ionic liquid (IL), [Oley][Oleic], in conjunction with carbon nanotube (CNT) mixtures. The primary objective is to determine the optimal CNT concentration that achieves effective lubrication for the IL-based lubricant. Through experimental investigation, notable reductions of 19.8 % in friction and 67.2% in wear are demonstrated when [Oley][Oleic] is blended with the optimum CNT concentration at 0.10 wt%. This study employs a friction-derived adsorption model to elucidate the underlying mechanisms of friction. The results indicate that the addition of CNTs leads to a larger adsorption surface coverage area of the lubricant molecules, resulting in decreased friction and wear. Synergistic attractive cooperative interactions among the IL molecules in the presence of CNTs are identified as a key factor in enhancing adsorption efficiency. These findings provide insights into the interaction between [Oley][Oleic] and CNTs when sheared, offering a predictive framework for understanding friction and wear behaviour specific to IL-based lubricants. By presenting a solution for reducing friction and wear, this study contributes to the development of energy-efficient and environmentally-friendly lubrication practices, opening avenues for further advancements in the field of lubrication and promoting sustainable tribological solutions for diverse applications.