

## Nanostructure and Friction of Choline AOT:Ethylene Glycol

Huaqing Xuan<sup>a</sup>, Hua Li<sup>a,b</sup>, Gregory Warr<sup>c</sup>, Rob Atkin<sup>a,\*</sup>

<sup>a</sup>*School of Molecular Sciences, The University of Western Australia, Perth, Australia*

<sup>b</sup>*Centre for Microscopy, Characterisation and Analysis, The University of Western Australia, Perth, Australia*

<sup>c</sup>*School of Chemistry and Sydney Nano Institute, The University of Sydney, Sydney, Australia*

\*Corresponding author's e-mail address: [rob.atkin@uwa.edu.au](mailto:rob.atkin@uwa.edu.au)

Surface-active ionic liquids (SAILs) combine the properties of ionic liquids and surfactants, exhibiting wide electrochemical windows, negligible vapor pressure, and well-defined nanostructures. The amphiphilic 1,4-bis(2-ethylhexoxy)-1,4-dioxobutane-2-sulfonate (AOT) anion is widely employed in SAILs because it produces well defined nanostructures,<sup>1</sup> and choline-based systems have attracted particular interest due to their biocompatibility.<sup>2</sup> In this study, we investigated the interfacial nanostructure and friction of choline AOT:ethylene glycol mixtures on steel surfaces using atomic force microscopy. Normal force measurements reveal distinct layered structures at various applied surface potentials, consistent with results for other SAIL systems.<sup>1</sup> Lateral force measurements showed that choline AOT:ethylene glycol mixtures are effective lubricants, and lubricity increases at positive potentials compared to open circuit conditions. These findings demonstrate that choline-based surface-active systems can form robust interfacial nanostructures with tunable friction properties via applied potential, making them promising candidates for sustainable lubrication and green technology applications.

### References

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Ms Huaqing Xuan received her master's degree in applied chemistry from Zhejiang Sci-Tech University, China before joining the Atkin group as a PhD student at the University of Western Australia. Her research interests encompass biocompatible ionic liquids, deep eutectic solvents, lubrication, and electrochemistry.