

## Supporting Information

# Understanding the Interactions of Imidazolium-based Ionic Liquids with Cell Membrane Models

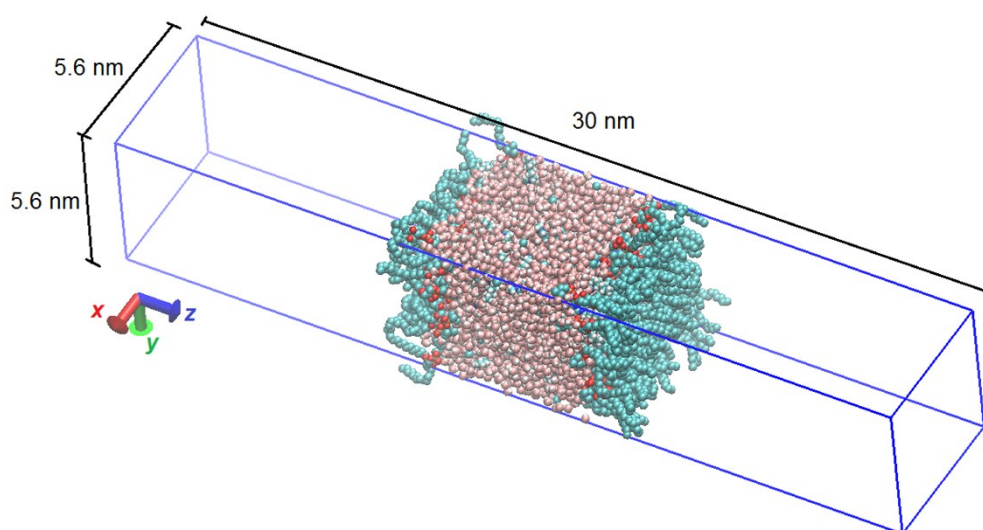
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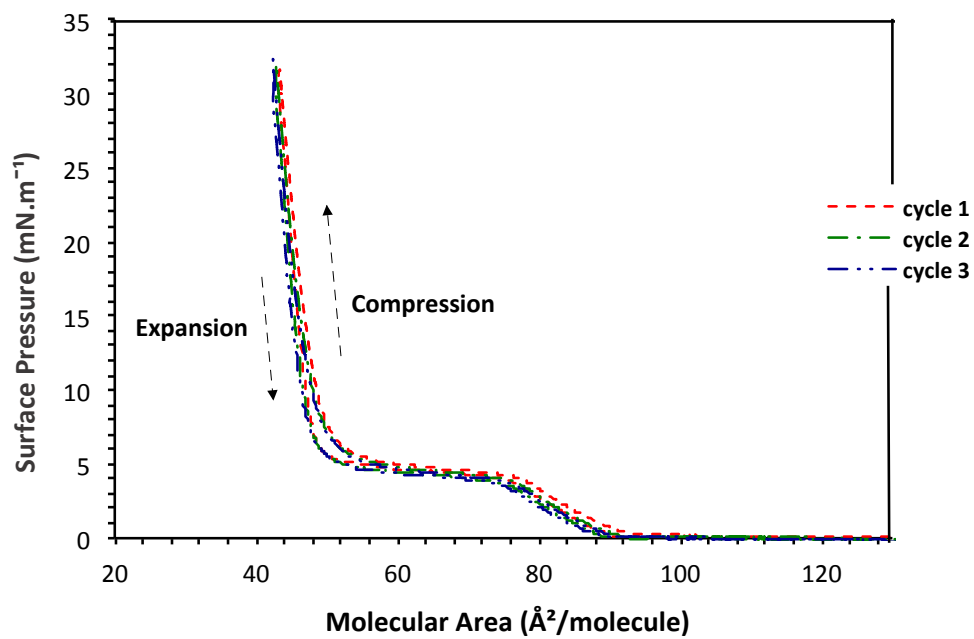
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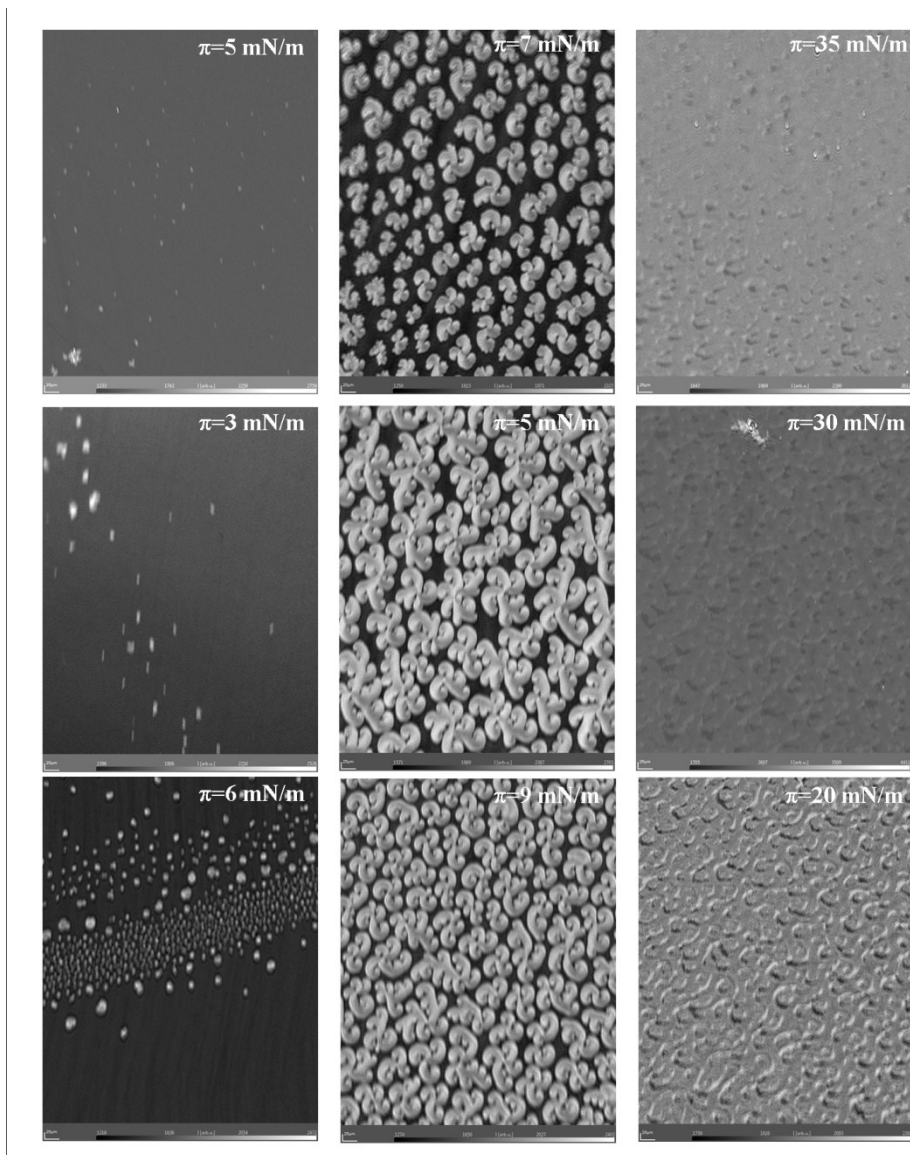
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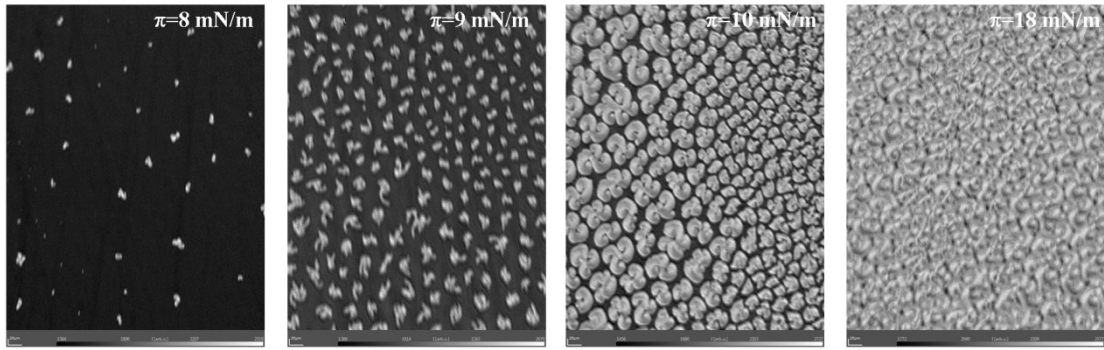
**Figure S11** – Example of simulation box containing 5000 water molecules, 50 IL ionic pairs and 50 DPPC molecules divided into two DPPC monolayers. The average area per DPPC molecule within the monolayer is in this case  $64 \text{ \AA}^2/\text{molecule}$ .



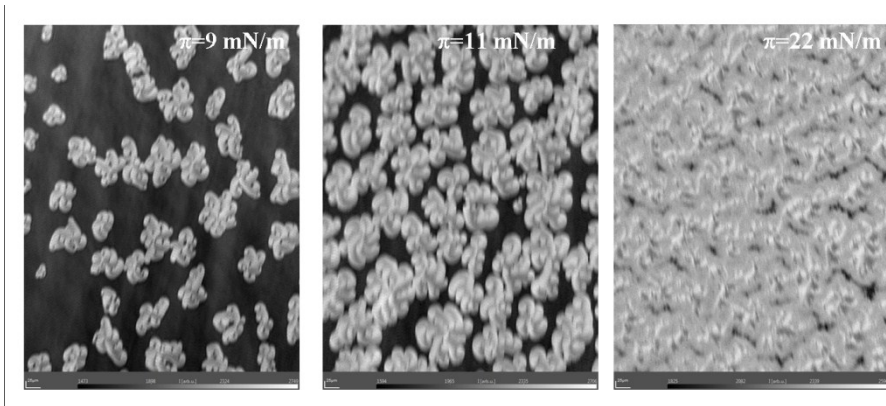
**Figure SI.2** – Isocycles of DPPC monolayers on an aqueous solution of  $[\text{C}_6\text{mim}]\text{Cl}$  at its  $\text{EC}_{50}$  ( $8.13 \times 10^{-4} \text{ mM}$ )



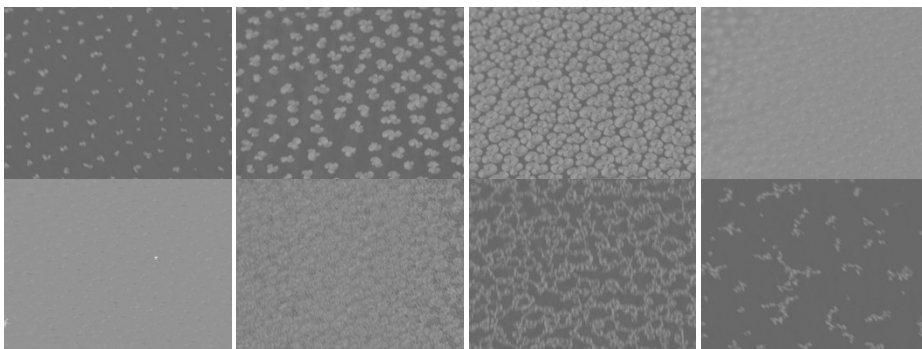
**Figure SI.3** – BAM images of DPPC collected using H<sub>2</sub>O, [C<sub>6</sub>mim]Cl and [Choline]Cl at: start of LE\_LC plateau (a); LE-LC region (b); LC region (c) ILs concentrations in the subphase correspond to their EC<sub>50</sub> of [C<sub>6</sub>mim]Cl.

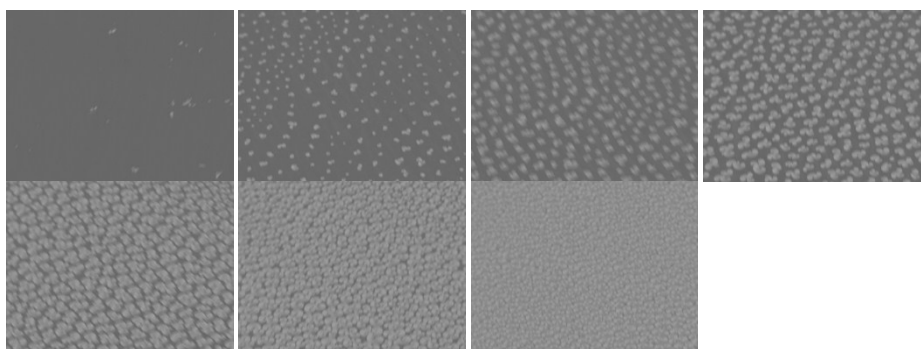


**Figure SI.4** - BAM images of DPPC monolayers collected using aqueous of  $[C_4mim]Cl$  at the concentration of  $[C_6mim]Cl$   $EC_{50}(8.13 \times 10^{-4} mM)$ , at: start of LE-LC plateau (a); LE-LC region (b); LC region (c)

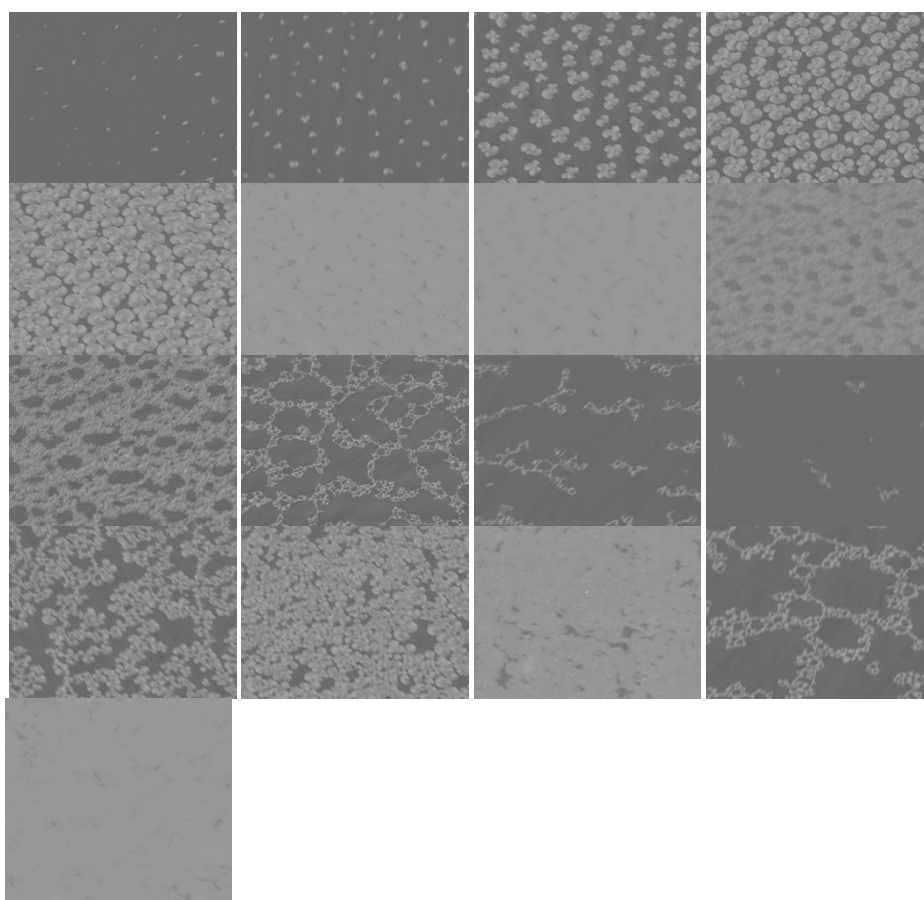


**Figure SI.5** - BAM images of DPPC monolayers collected using aqueous of  $[C_8mim]Cl$  at the concentration of  $[C_6mim]Cl$   $EC_{50}(8.13 \times 10^{-4} mM)$ , at: start of LE\_LC plateau (a); LE-LC region (b); LC region (c)



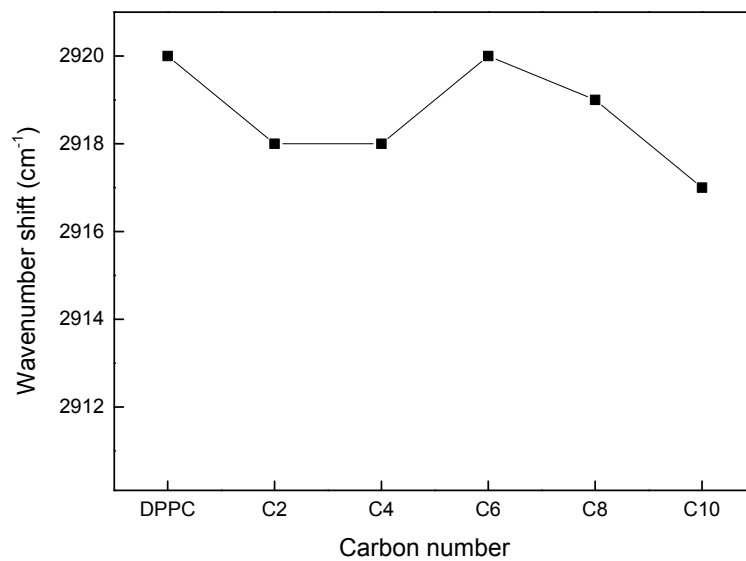


(a) DPPC on water: Compression-expansion-recompression

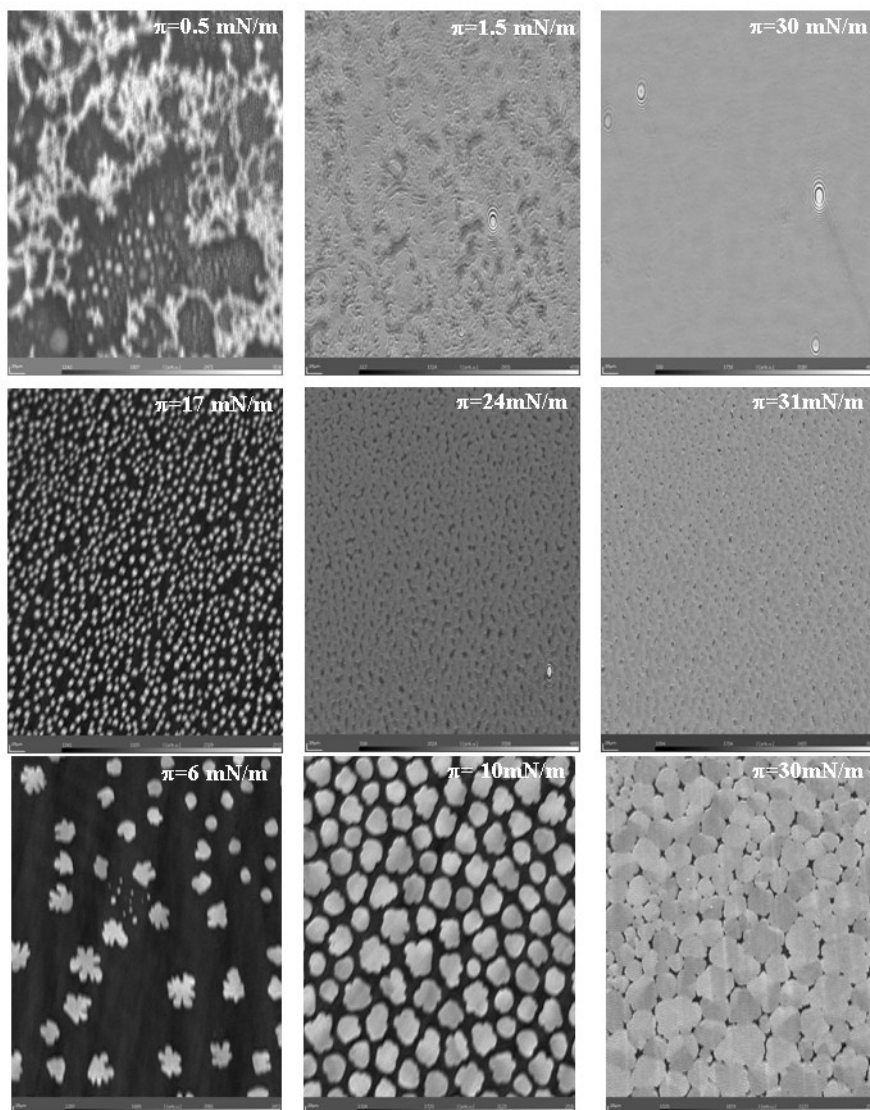


(b) DPPC on aqueous solution of [C<sub>6</sub>mim]Cl: Compression-expansion-recompression

**Figure SI.6** - BAM images of Isocycles of DPPC monolayers (a) on water and (b) on aqueous solution of [C<sub>6</sub>mim]Cl at its EC<sub>50</sub> ( $8.13 \times 10^{-4}$  mM)



**Figure SI.7** - Wavenumber shift of the  $\nu_s(\text{CH}_2)$  as a function of the number of carbons in the alkyl chain of imidazolium-based ILs.



**Figure SI.8** - BAM images of DPPG collected using H<sub>2</sub>O, [C<sub>6</sub>mim]Cl and [Chol]Cl at different barrier positions, at the concentration of [C<sub>6</sub>mim]Cl EC<sub>50</sub> ( $8.13 \times 10^{-4}$  mM).