Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Amphiphilic copolymers change the nature of the ordered-to-disordered phase transition of lipid membranes from discontinuous to continuous†

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Supplementary Information

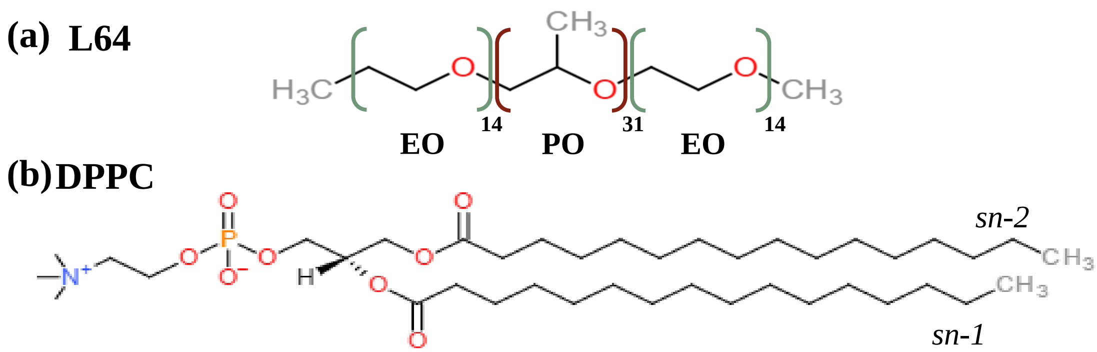


Fig. S1 (a) Molecular structure of the L64 Pluronic. The blocks in parentheses highlight the ethylene oxide (EO) (green) and the propylene oxide (PO) (red) segments. (b) Molecular structure of the DPPC lipid.

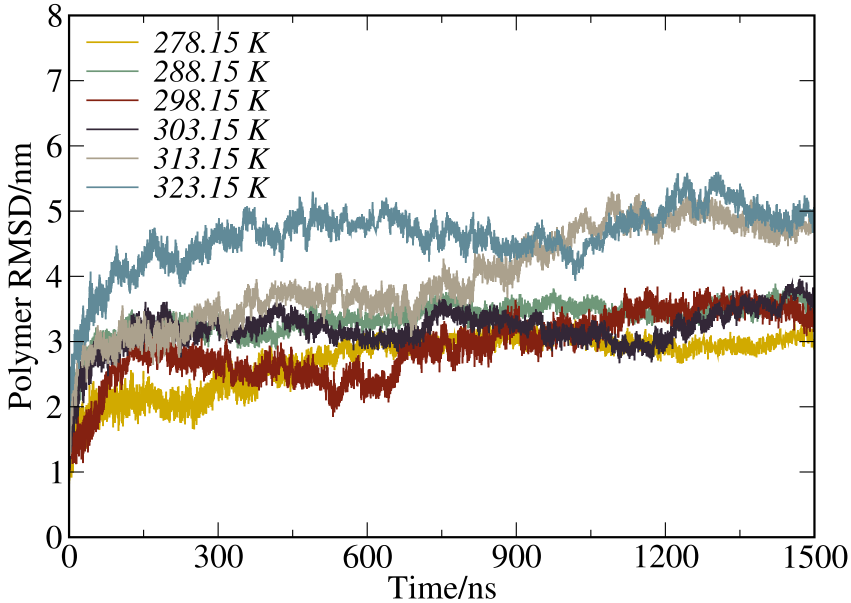
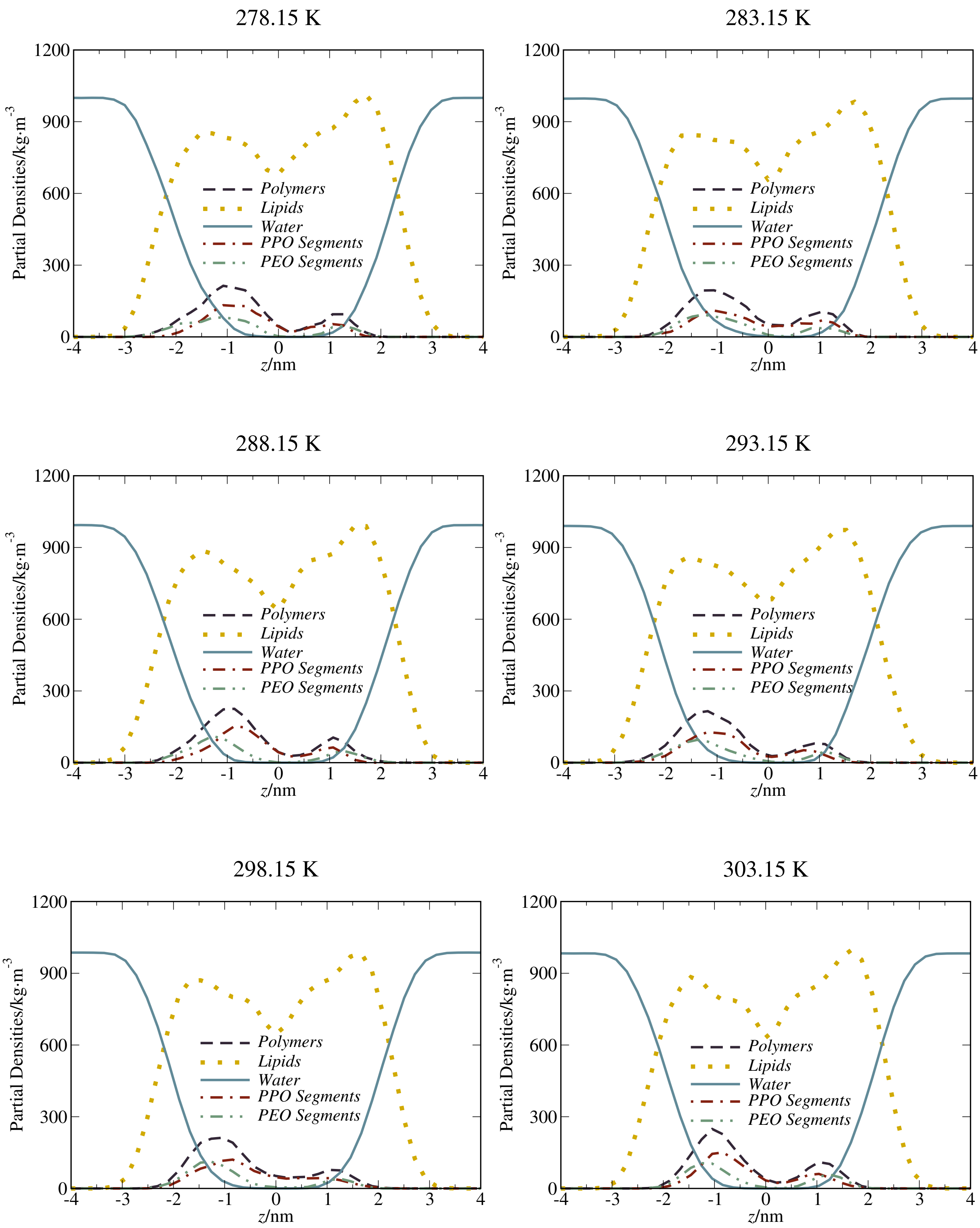


Fig. S2 Root mean square deviation (RMSD) of the L64 chains for selected temperatures.


278.15 K
283.15 K
288.15 K
293.15 K
298.15 K
303.15 K
Partial Densities/kg·m-3
z/nm
Polymers
Lipids
Water
PPO Segments
PEO Segments

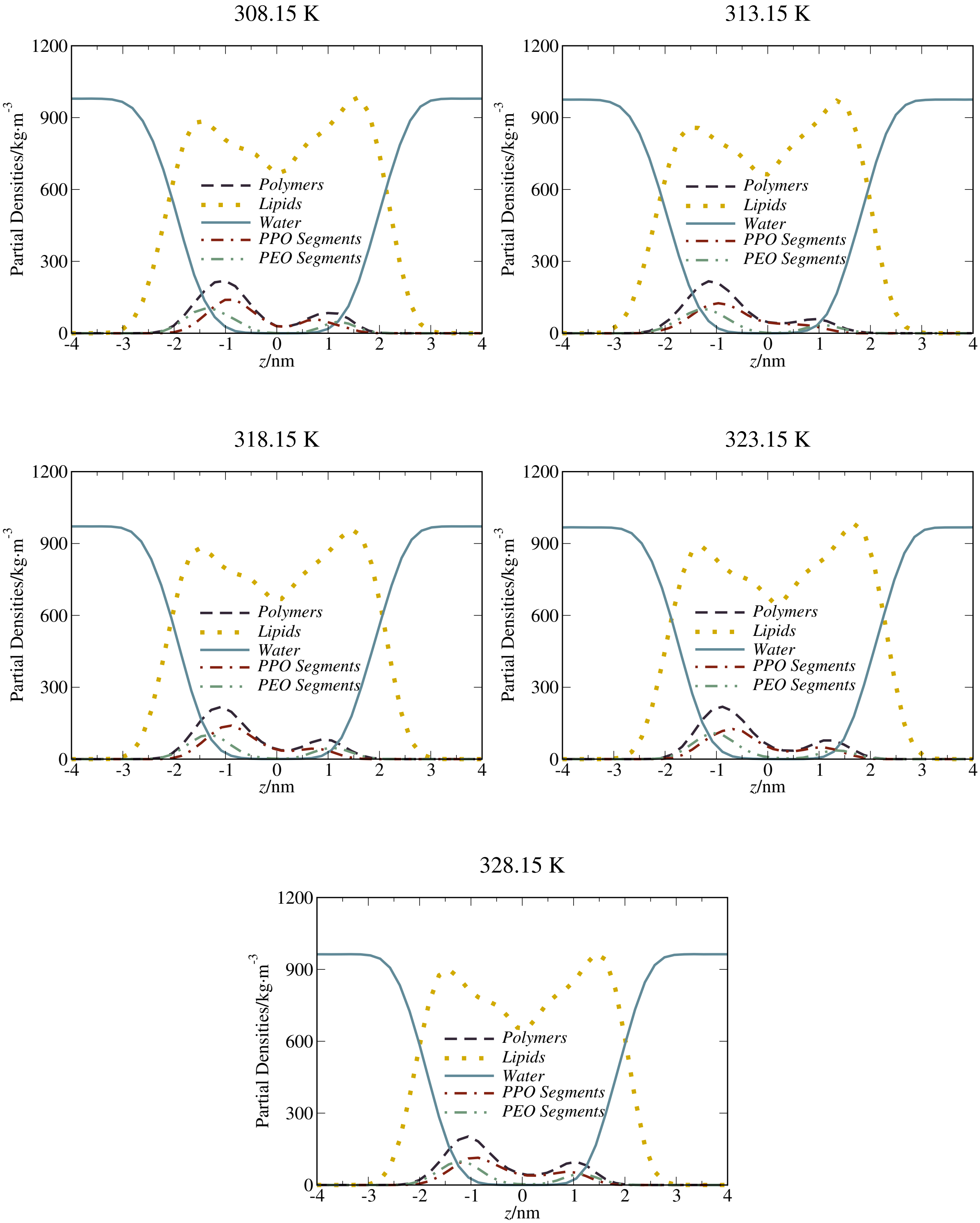
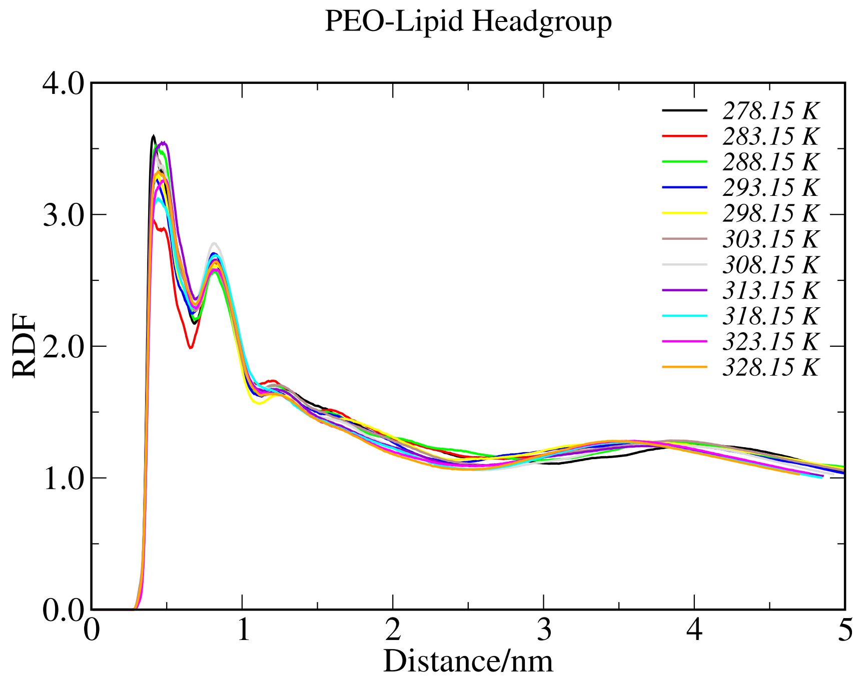


Fig. S3 Mass density profiles of all the system components of the *hybrid* membranes in all the studied temperatures, averaged over the final 50 ns of each trajectory.



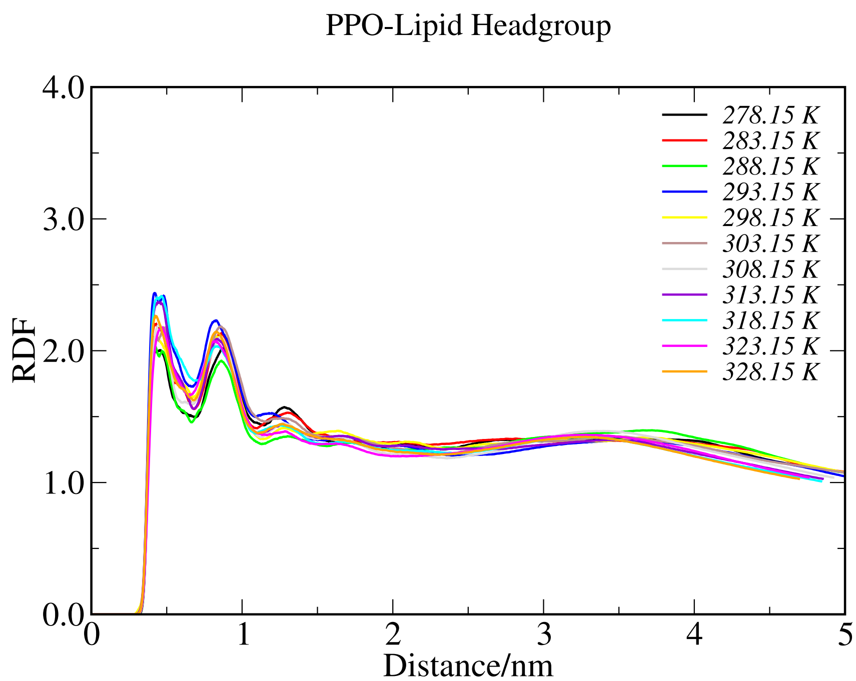


Fig. S4 Radial distribution functions (RDF) calculated over the final 50 ns of the trajectories. *Up*: PEO-P8, *down*: PPO-P8. The RDFs were computed for the center of mass of the PEO or PPO segment of each polymer chain separately and then averaged over all the twelve chains.

Table S1 Area per lipid (A_{lip}) for the *pure* DPPC in all temperatures, averaged over the final 100 ns of each trajectory

T [K]	**DPPC** $\mathbf{A_{lip}}$ [nm^2]
278.15	0.520 ± 0.002
283.15	0.528 ± 0.002
288.15	0.513 ± 0.002
293.15	0.526 ± 0.002
298.15	0.514 ± 0.003
303.15	0.567 ± 0.009
308.15	0.606 ± 0.007
313.15	0.617 ± 0.007
318.15	0.622 ± 0.008
323.15	0.631 ± 0.006
328.15	0.637 ± 0.007

Table S2 Lipid lateral diffusion coefficients (D_{lip}) for the DPPC and the DPPC/L64 membranes in all temperatures

	DPPC	DPPC/L64
T [K]	$\mathbf{D_{lip}}$ $[\times 10^{-12}\ \mathrm{m^2 \cdot s^{-1}}]$	$\mathbf{D_{lip}}$ $[\times 10^{-12}\ \mathrm{m^2 \cdot s^{-1}}]$
278.15	0.142 ± 0.037	0.383 ± 0.099
283.15	0.123 ± 0.078	0.433 ± 0.045
288.15	0.101 ± 0.007	0.289 ± 0.094
293.15	0.096 ± 0.054	0.644 ± 0.252
298.15	0.188 ± 0.042	0.901 ± 0.346
303.15	2.553 ± 0.444	1.183 ± 0.487
308.15	4.612 ± 1.645	1.201 ± 0.300
313.15	8.812 ± 0.521	1.493 ± 0.318
318.15	5.788 ± 0.591	2.512 ± 0.767
323.15	8.853 ± 1.138	2.956 ± 1.306
328.15	12.400 ± 1.600	4.606 ± 1.204

Table S3 Diffusion pre-exponenttial factors (D_{lip0}) of the lipids in the DPPC and the DPPC/L64 membranes in the regions of low temperature and high temperature

<table>
<tr><th></th><th>Low T Region
D_{lip0} [kJ/mol]</th><th>High T Region
D_{lip0} [kJ/mol]</th></tr>
<tr><td>DPPC</td><td>$6.8 \cdot 10^{-13}$</td><td>$1.7 \cdot 10^{-4}$</td></tr>
<tr><td>DPPC/L64</td><td colspan="2">$6.4 \cdot 10^{-6}$</td></tr>
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