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The structure of unsupported, self-assembled phospholipid bilayers on an artificially nano-patterned surface GREGORY SMITH, SEUNG-YONG JUNG, JAMES BROWNING, JONG KEUM, NICKOLAY LAVRIK, PAT COLLIER, Oak Ridge National Laboratory — We present neutron reflectivity measurements of the in-situ microscopic architecture of phospholipid molecules at the interface between a regularly nano-patterned surface and an aqueous sub-phase using neutron reflectometry. 1,2-dilauroyl-sn-glycero-3-phosphocholine (DLPC) single bilayers were deposited on a patterned silicon substrate. The substrate was patterned with a rectangular array of nano-scaled holes using e-beam nano-lithographic techniques. The goal of these experiments is to produce a set of small freely-suspended bilayers spanning the nanostructured surface. We compare results for films deposited by vesicle adsorption or by the Langmuir–Shafer (L-S) technique. Initial data analysis shows that there are well formed bilayers on the surface. Detailed analysis of the reflectivity curves will be presented to confirm details of the architecture of these bilayer films. Bilayers prepared in this way may serve as model single bilayer systems with freely suspended areas for the study of membrane functionality in biological and biomimetic materials and systems.

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