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Structure of single-supported DMPC lipid bilayer membranes as a function of hydration level studied by neutron reflectivity and Atomic Force Microscopy[1] A. MISKOWIEC, P. SCHNASE, M. BAI, H. TAUB, U. Mo., F.Y. HANSEN, Tech. U. of Denmark, M. DUBEY, S. SINGH, J. MAJEWSKI, LANSCE — We have recently been investigating the diffusion of water on single-supported DMPC lipid bilayer membranes at different levels of hydration, using high-resolution quasielastic neutron scattering (QNS). To aid in the interpretation of these QNS studies, we have conducted neutron reflectivity (NR) measurements on SPEAR at LANSCE to characterize the structure of similarly prepared samples. Protonated DMPC membranes were deposited onto SiO_2-coated Si(100) substrates and characterized by Atomic Force Microscopy (AFM) at different levels of hydration. We find reasonable agreement between the membrane thickness determined by NR and AFM at room temperature. We also find consistency between the scattering length density (SLD) profile in the vicinity of the upper leaflet of the supported DMPC membrane and that found in a molecular dynamics simulation of a freestanding membrane at 303 K. However, the fit to the reflectivity curve can be improved by modifying the SLD profile near the leaflet closest to the SiO_2 surface.

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