

Abstract Submitted
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Studies of the Temperature-Dependent Structure of DMPC Bilayer Lipid Membranes by Atomic Force Microscopy¹ A. MISKOWIEC, M. BAI, H. TAUB, U. MO., F.Y. HANSEN, Tech. U. Denmark — We are using Atomic Force Microscopy (AFM) to characterize the structure and topography of single-supported bilayer lipid membranes to complement quasielastic neutron scattering investigations of the membrane dynamics. To investigate the effect of different membrane-substrate interactions, samples of hydrated DMPC bilayer membranes have been fabricated on four different supports: 1) a bare SiO₂-coated Si(100) wafer; 2) a SiO₂-coated Si(100) wafer preplated with a monolayer of the pure alkane *n*-C₃₆H₇₄ in which the molecules are aligned with their long axis parallel to the SiO₂ surface; 3) an underlying DMPC membrane itself supported on a SiO₂ surface; and 4) a SiO₂-coated Si(100) wafer covered with a polyethylenimine (PEI) cushion. Above room temperature, our AFM images show a decrease in the DMPC membrane thickness with increasing temperature consistent with chain-melting transitions of the lipid tails. The onset temperature at which the membrane thickness begins to decrease and the temperature at which its thickness saturates both decrease with weaker binding to the support and with a greater level of hydration.

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