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Lipid bilayer dynamics: Effects of segregation between DMPC and DSPC MICHIHIRO NAGAO, NIST and Indiana University, PAUL BUTLER, NIST and University of Delaware, ANDREA WOODKA, United States Military Academy, RANA ASHKAR, NIST and University of Maryland — Dynamics in lipid bilayers are believed to play a key role in membrane stabilization. During the past decade, neutron spin echo (NSE) has been used to study the bending elastic behavior of large unilamellar vesicles (radius of around 50 nm). These results reveal that above Tm, where the lipid tails display liquid ordering, the bending modulus is on the order of 10 kT. Below Tm, the value increases by more than an order of magnitude. Recently NSE revealed thickness fluctuations of lipid bilayers above Tm, while none are discernable below Tm. The estimated amplitude of the observed membrane thickness fluctuations is approximately 4 angstroms and the time scale of the motion is on the order of 100 ns. In the present research, structure and dynamics of mixed lipid between dimyristoylphosphatidylcholine (DMPC) and distearoylphosphatidylcholine (DSPC) were investigated using small-angle neutron scattering (SANS) and NSE. DSPC has a higher Tm than DMPC. The mixed lipid systems show segregation between domains in the temperature range between Tm of DMPC and DSPC. The SANS and NSE measurements were performed with changing temperature from above to below the Tm of DSPC. The result indicates a slow down of thickness fluctuations once the segregation takes place.

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