

## Individual Monolayer Phase Effect on Nanometer-Scale Surface Properties of Phospholipid Bilayers

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Phospholipid bilayers were formed on mica using Langmuir-Blodgett technique and liposome fusion, as a model system for biomembranes. Nanometer-scale surface physical properties were quantitatively characterized upon the different phases of the monolayers. The less hydration/steric forces were observed at the liquid-phase of the lipid layer than at the solid-phase. The forces appear to be related to its low mechanical stability of the lipid layer. When the outer lipid layer became from the solid-phase to the liquid-phase, the force changed the most significantly among individual monolayer phase transitions. In addition, it was found that the stability also depended on the asymmetry of the lipid bilayers. For the lipid bilayers which were composed of liquid-phase and solid-phase monolayers, the more hydration/steric forces were shown over the bilayers whose inner lipid layer was liquid phase than solid-phase.