

## **Nano-domain equilibria in biomimetic membranes**

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The properties of mixed phospholipid membranes have been extensively studied for nearly half a century due to the importance of membrane organization for fundamental biophysical processes sustaining life. In these studies phase diagrams of mixed lipids have been compiled using partially hydrated “bulk” samples. The extreme dimensions of a biomimetic membrane - essentially two dimensional liquid of a few nm thickness thus far defeated all attempts to confirm the validity of the bulk phase diagrams in single bilayer biomimetic membranes, and hence not much is known about the segregation and phase equilibria of mixed phospholipid membranes.

In our work, quartz crystal microbalance with dissipation (QCM) based nano-viscosity measurements were used to detect the viscosity changes accompanying phase transitions in lipid membranes. This surface calorimetry method was used to study phase segregation and nano-domain formation in partially suspended single bilayer membranes on gold support. QCM temperature ramping experiments identified the coexistence of domains of different lipid content, and hence different transition temperature, in 1, 2-dimyristoyl-sn-glycero-3-phosphocholine (DMPC) and 1, 2-dipalmitoyl-sn-glycero-3-phosphocholine (DPPC) mixtures, allowing the construction of single bilayer membrane phase diagrams with implications to the models of membrane stability.