

# Phase Transitions of Binary Lipid Mixtures: a Combined Study by Adiabatic Scanning Calorimetry and Quartz Crystal Microbalance with Dissipation Monitoring

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The interest in lipid phase behavior stems from the nature and the thermodynamics of phase transitions, the mechanisms behind lipid miscibility and lateral phase separation, and the existence of critical phenomena [1]. This requires the knowledge of static and kinetic thermodynamic properties of pure lipids and lipid mixtures. In this work, we study phase transitions of lipid mixtures by means of Peltier-element-based adiabatic scanning calorimetry (pASC) [2-5] and quartz crystal microbalance with dissipation monitoring (QCM-D) [6]. We test the capability of pASC, a novel type of calorimeter, for measuring biologically relevant samples, for which

unambiguous information on thermal properties, namely, the specific heat capacity  $c_p(T)$  and the specific enthalpy  $h(T)$ , is obtained. QCM-D is proposed as a genuine way of determining phase diagrams by analysing the temperature dependence of the viscosity  $\eta(T)$ . Two binary mixtures of phospholipids with the same polar head and differing in the alkyl chain length, DMPC + DPPC and DMPC + DSPC, are presented. Both techniques give consistent phase diagrams, which compare well with literature results, showing their capability to map the phase behaviour of single lipids as well as lipid mixtures.

## References

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