



Phase behavior of phospholipid bilayers under high pressure

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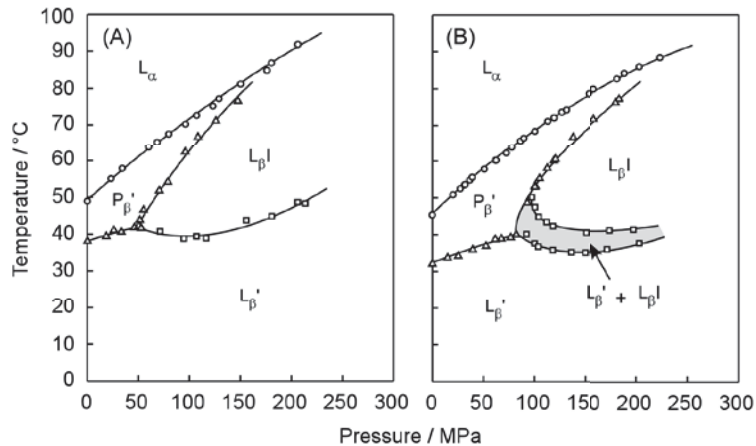


Fig.1 Pressure-temperature phase diagrams of asymmetric PC bilayers.

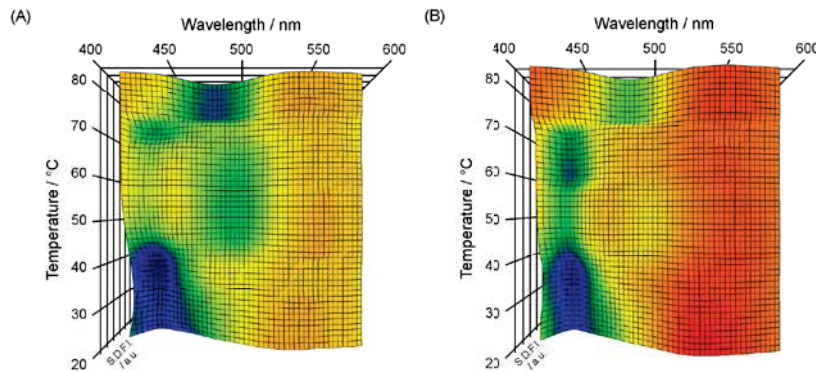


Fig. 2 3D image plots of asymmetric PC bilayers.

Content:

Phospholipids form bilayer aggregates called vesicles or liposomes in aqueous solution. The aggregates induce structural changes called phase transitions depending on temperature, pressure, pH and added salts. Studies concerning the effect of the environmental variables on lipid membranes concentrate on that of temperature and concentration of added salts and there are few reports of pressure effect.

We have focused our attention on pressure as experiment variables and constructed the thermodynamic quantities including the volume information and temperature-pressure phase diagrams of various phospholipid bilayers. Recently, we have established a high-pressure fluorescence technique using the fluorescent probe Prodan, which enables us to observe precise phase transitions, especially bilayer interdigitation. Further, we have also showed that a three-dimensional image plot based on the second-derivative of the Prodan fluorescence provides a correlation between the probe location in the bilayer and the state of the bilayer.

Keywords : phospholipid, phase transition, high pressure

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