

610c Formation of Vesicles from Undecylenic Acid and Their Subsequent Polymerization

Jae-Ho Lee and Srinivasa R. Raghavan

Undecylenic acid (UDA) is a single-tailed fatty acid that contains a double bond at the end of its 11-carbon tail. Previously, there has been much interest in the polymerization of micelles formed by UDA in water. Here, we show that UDA can also be induced to form vesicles in water and we describe our attempts to polymerize the vesicle bilayers by free-radical techniques. Similar to other fatty acids, the type of aggregate formed by UDA in water can be tuned by adjusting the pH of the solution, preferably using a buffer. Vesicles are formed in an intermediate pH range (6-8), whereas at higher pH (> 8), the preferred state of UDA is in spherical or rodlike micelles. At low pH, multiple phases are observed in the samples. We have confirmed the presence of vesicles in the intermediate pH range using small-angle neutron scattering (SANS) and cryo-transmission electron microscopy (cryo-TEM). The subsequent polymerization of UDA bilayers was attempted using DMPA initiator at elevated temperatures. A partial polymerization of the bilayers appears to be achieved and the polymerized vesicles resist disruption into micelles when the solution pH is increased.