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Coalescence Kinetics of Lipid Based Bicelles ANDREW HU, TAI-HSI FAN, Department of Mechanical Engineering, University of Connecticut, Storrs, CT 06269-3139, JOHN KATSARAS, Neutron Sciences Directorate, Oak Ridge National Laboratory, Oak Ridge, TN 37831,, YAN XIA, MING LI, MU-PING NIEH, Chemical and Biomolecular Engineering Department,University of Connecticut, Storrs, CT 06269-3139, USA — Uniform nanodisc can be self-assembled from lipid mixtures of dimyristoyl phosphatidylcholine (DMPC), dimyristoyl phosphatidylglycerol (DMPG), and dihexanoyl phosphatidylcholine (DHPC). This study focuses on the theoretical and experimental growth kinetics of phospholipid based nanodiscs. Motivation for this project comes from the nanodisc's small size and their potential use as a carrier for drug delivery. It was observed that at high total lipid concentration the nanodiscs are stable at approximately 10 nm. However, growth of these nanodiscs is observed at relatively low total lipid concentrations. Dynamic light scattering (DLS) is used to monitor the size and growth rate of these nanodiscs at different solution conditions. The growth at low concentrations is caused by to the transfer of charged lipid (DMPG) from the discs to the solution, reducing the Columbic interaction. The growth of nanodisc as a function of size and surface potential is modeled using the Smoluchowski transport equation with transport-limited boundary conditions.

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