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Thermotropic vibrational spectroscopy of newly developed self-forming PEGylated lipids RAJAN BISTA, REINHARD BRUCH, AARON COVINGTON, University of Nevada, Reno, Nevada, USA — Vibrational spectroscopy can provide valuable structural information about lipids, which are important molecular components of biological membranes. In the present study, we have focused on the thermotropic vibrational spectroscopy of two newly developed synthetic PEGylated lipids trademarked as QuSomes^{TM} to investigate the phase behaviors and associated changes in the conformational order. In contrast to conventional phospholipids, this new kind of lipid forms liposomes spontaneously upon hydration, without the supply of external activation energy. Variable-temperature thin-layered Fourier Transform Infrared (FTIR) spectroscopy and Raman spectromicroscopy have been developed and employed in order to plot the transition temperature profiles showing the phase behavior of these new lipids composed of 1,2-dimyristoyl-*rac*-glycerol-3-dodecaethylene glycol (GDM-12) and 1,2-distearoyl-*rac*-glycerol-3-triicosaethylene glycol (GDS-23). Furthermore, several spectral indicators were calculated and correlated which allowed for the deduction of various aspects of molecular structure as well as intramolecular motion and intermolecular interactions occurred during temperature change. To confirm the observations, differential scanning calorimetry (DSC) was applied and revealed a good agreement with the FTIR and Raman spectroscopic results.

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