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Vibrational spectroscopic study of newly developed self-forming lipids and nanovesicles. RAJAN BISTA, REINHARD BRUCH, University of Nevada, Reno, Nevada, USA — We present the first experimental study of self-forming synthetic nanovesicles, trademarked as QuSomes^{TM}, using vibrational spectroscopic techniques namely near-infrared (NIR) and laser tweezers Raman spectroscopy. Raman spectra of these new artificial nanovesicles suspended in Phosphate Buffered Saline (PBS) have been obtained by using an inverted confocal laser-tweezers-Raman-microscopy system in the spectral range of 3100 to 500 cm^{-1}. This spectrometer works with an 80 mW diode-pumped solid-state laser, operating at a wavelength of 785 nm in the TEM_{00} mode. The laser is used both for optical trapping and Raman excitation. Similarly, NIR absorption spectra of these novel nanovesicles have been recorded in the spectral range of 9000-4800 cm^{-1} by using a new miniaturized micro-mirror spectrometer based on micro-optical-electro-mechanical systems (MOEMS) technology. In this work, we have found that the most prominent bands in the studied spectral region of Raman spectra are dominated by vibrational modes arising from C-C and CH_2 bonds. Similarly, NIR spectra are primarily assigned as first and second overtone of C-H stretching mode and second overtone of C=O stretching mode. These spectroscopic techniques have proven to be an excellent tool to establish the fingerprint region revealing the molecular structure and conformation of QuSomes^{TM} nanoparticles.

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