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Mechanical Response of Lipid Multibilayers From Micro- and Nano-Particle Embedment[1] GREGORY MCKENNA, Texas Tech University, KIRTHI DESHPANDE, Texas Tech Univesity — We have used atomic force microscopy (AFM) to image micro- to nano-meter sized particles embedded into lipid multilayer films prepared by a spin coating technique. The lipid investigated was 1, 2-dipalmitoyl-Sn-glycero-3-phosphotidylcholine (DPPC). Gold, silica and polystyrene were used for the embedding particles. Particle diameters ranged from 50 to 300 nm and all tests were performed at atmospheric conditions and ambient temperature. Film thickness was approximately 87 nm based on AFM determination. We used the elastic analysis for contact between a rigid sphere and elastic substrate with the work of adhesion w_a acting as the force on the sphere to determine the shear modulus G in terms of w_a, the particle radius and the height of the sphere that remains above the surface. From the AFM height measurements, we find that the shear modulus for the DPPC falls in the range from 3 to 35 MPa, but seems independent of particle type and particle diameter. The potential for the particle embedment method for mechanical property determination of soft materials will be discussed.

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Gregory McKenna
Texas Tech University

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