Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Associative polymers bridging between layers of multilamellar vesicles. SEO CHOI, University of Massachusetts Amherst, SURITA BHATIA, University of Massachusetts Amherst — Multilamellar vesicles can be found in a variety of pharmaceutical formulations, personal care products, and home care products. Hydrophobically modified associative polymers are often used to stabilize the vesicles or to control the rheological properties of these formulations. The hydrophobic groups are expected to insert themselves into the vesicle bilayers. Recent experimental work shows that hydrophobically modified polymers may from bridges between vesicles or may bridge between layers of a single vesicle. The latter configuration forces an interlayer spacing roughly equal to the radius of gyration of the backbone between associative groups. We have performed simple mean-field calculations on ideal telechelic associative polymers between concentric spherical surfaces. We find that the free energy per chain has an attractive minimum when the layer spacing is approximately $N^{1/2}l$, which is consistent with experimental results. The depth of the minimum depends on both chain length and curvature, and as expected when the curvature becomes small, the result for telechelic chains between flat surfaces is recovered.

Surita Bhatia
University of Massachusetts Amherst

Date submitted: 30 Nov 2005 Electronic form version 1.4