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Vesicle-Templated Supramolecular Assembly of Alginate Nanogels JENNIFER HONG, National Institutes of Standards and Technology NIST/University of Maryland College Park, WYATT VREELAND, NIST, Analytical Chemistry Division CSTL, SRINIVASA RAGHAVAN, University of Maryland College Park. Department of Chemical & Biomolecular Engineering, LAURIE LOCASCIO, NIST, Analytical Chemistry Division CSTL, MICHAEL GAITAN, NIST, Semiconductor Electronics Division EEEL — In this work, large uni- and multilamellar dipalmitoyl phosphatidylcholine (DPPC) liposomes (800-900 nm in diameter) were used as templates for the formation of alginate gels. DPPC liposomes encapsulating sodium alginate were prepared in a 15 mM NaCl buffer solution by the solvent injection method, followed by several freeze/thaw cycles to achieve higher encapsulation efficiency and larger vesicle size. Purified liposomes were placed in a 10 mM CaCl2 buffer solution and permeabilized by heating and cooling over the phase transition temperature (Tm) of DPPC. The increased membrane permeability at the Tm allowed calcium ions from the surrounding buffer solution to traverse the membrane to the interior region and subsequently crosslink the encapsulated alginate. Removal of the lipid by detergent resulted in nanogels that were similar in size (800-900 nm in diameter) to the template liposome, as characterized by multi-angle and dynamic light scattering techniques. In the future these nanogels may be useful for single-molecule encapsulation or controlled release applications.

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