610a Self-Assembled Encapsulation Membranes from Bioactive Colloids

Kevin D. Hermanson, Daniel Huemmerich, Thomas Scheibel, and Andreas R. Bausch

Micron-size sculpted structures are important for encapsulation technologies and as building blocks for larger devices. One of the most ecumenical structures is that of the thin shelled vesicle. Such thin shelled vesicles can be formed from a large number of different colloids through the self-assembly of colloidal particles at the interface of emulsion droplets. Here this technique is combined with the natural propensity of biological molecules to associate and bind. In this process biomimetic colloids are adsorbed on the interface of an emulsion droplet. Once the colloids are adsorbed, the emulsion interface induces the natural binding behavior of the biological molecules causing the molecules to bind together. The resulting structures are micron-sized vesicles with a shell thickness between 5 and 40 nanometers. The microstructural and mechanical properties of the final shell resemble the natural properties of the biological molecules. Because of the ability to mimic these properties in an artificial system, this technique potentially offers a convenient approach to the formation of biologically-compatible, easily-functionalizable structures.