

Abstract Submitted  
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**Control of domain formation and budding in multicomponent bilayer membranes** KURT A. SMITH, ANNA C. BALAZS, University of Pittsburgh  
— Phase separation in fluid bilayer membranes, of lipids or block copolymers, can lead to a budding transition when line tension between the two phases comes to dominate the bending rigidity of the membrane. This leads to a nearly spherical bud connected to the membrane by a small neck. We examine the role of molecular architecture and composition on this shape transformation. Specifically we consider the inclusion of twin-tail amphiphiles which lower the free energy of the system by segregating to the interface between the two phases. Such additives can be used to lower the surface tension, thus controlling the critical size at which buds form. In addition they stabilize the neck when budding does occur, by acting essentially as stitches, thereby increasing the energy needed to detach the bud from the membrane. Using dissipative particle dynamics we are able to simulate the dynamics of large membrane patches over relevant time scales.

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