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Encapsulation of Graphene and Nanoparticles in Phospholipid Membranes PETR KRAL, ALEXEY TITOV, RYAN PEARSON, HENRY CHAN, University of Illinois at Chicago — We demonstrate by coarse-grained molecular dynamics simulations that graphene sheets and surfactant coated nanoparticle clusters could be hosted in the hydrophobic interior of membranes formed by amphiphilic 1-palmitoyl-2-oleoyl-sn-glycero-3-phosphocholine phospholipids. These hybrid graphene-membrane superstructures might be prepared by forming hydrated micelles of individual graphene flakes or nanoparticles clusters covered by phospholipids, which are later fused with the membranes. We study the effect of interparticle coupling on the organization of the nanoparticles inside lipid bilayer membranes and investigate how small surfactant coated nanorods and nanodiscs are self-assembled over there. The composite systems might be used in the development of biosensors and bioelectronic materials.

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