Hierarchical organization of chiral colloidal

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Liquid–liquid phase separation in bulk proceeds through the continuous coalescence of droplets until the system undergoes complete phase separation. But when colloids, nanoparticles or proteins are confined to interfaces, surfaces or membranes, their interactions differ fundamentally from those mediated by isotropic solvents, and this results in significantly more complex phase behaviour. We have show that liquid–liquid phase separation in monolayer membranes composed of two dissimilar chiral colloidal rods gives rise to thermodynamically stable rafts that constantly exchange monomeric rods with the background reservoir to maintain a self-limited size. Our observations demonstrate a robust membrane-based pathway for the assembly of monodisperse membrane clusters that is complementary to existing methods for colloid assembly in bulk suspensions.