Assembling amphiphilic colloids into crystalline and quasi-crystalline structures

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The self-assembly of nanoscale particles opens routes to materials that are otherwise not possible to manufacture. Recent advances in the controlled synthesis of nanoscale building blocks has led to the discovery of completely new self-assembly pathways. Among these are the self-assembly of inorganic nanoparticles into micelles and vesicles [1], of semiconductor nanoparticles into sheets via two-dimensional oriented attachment [2], and the formation of lyotropic quasicrystals of 12-fold and 18-fold rotational symmetry [3].

![SANS-pattern of a lyotropic quasicrystal with 12-fold symmetry](image)

Details of these self-assembly processes have only partly been elucidated. It has, however, become clear that it is the surface layer of the nanoparticles that plays a decisive role. A control of these self-assembly processes opens routes to opto-electronic devices that are otherwise very difficult to manufacture.