

Directional self-assembly of patchy particles

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In this communication, we report on a new route to synthesize patchy particles with a controlled number of patches or dimples as well as on their potential use as building blocks for the elaboration of new supracolloids with unusual morphology and optical properties.

The so-patchy particles were derived from colloidal molecules¹ made of a central silica core surrounded by a precise number n of polystyrene satellite nodules^{2,3}. We succeeded in promoting the growth of the silica core of these colloidal molecules. While growing, the silica surface conforms to the shape of the PS nodules. After the dissolution of the polystyrene nodules and functionalization of the dimples, homogeneous batches of silica particles with n well-located patches at their surface can be produced in large quantities^{4,5}. The patchy character of the silica particles was evidenced by TEM characterization.

Finally, we will present new results on the self-assembly of the obtained patchy particles with various valences in the form of supraparticles, supramicelles (see figure) and 1D-chains.

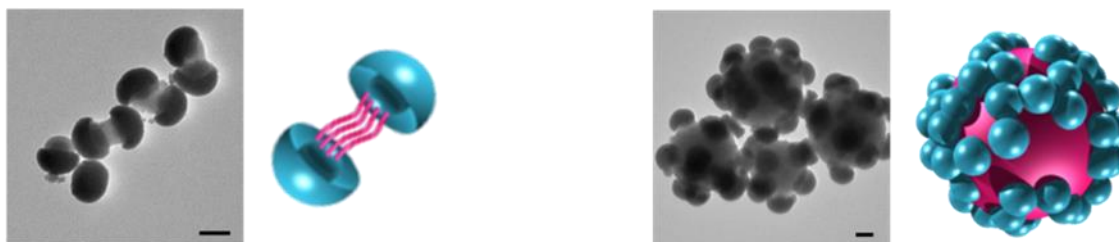


Figure: Self-assembly of patchy particles with one patch in the form of dimer-like structures (left) and supramicelles (right). Scale bare : 100 nm.

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