Self assembly of hollow cones in a bola-amphiphile/hexadiamine salt solution

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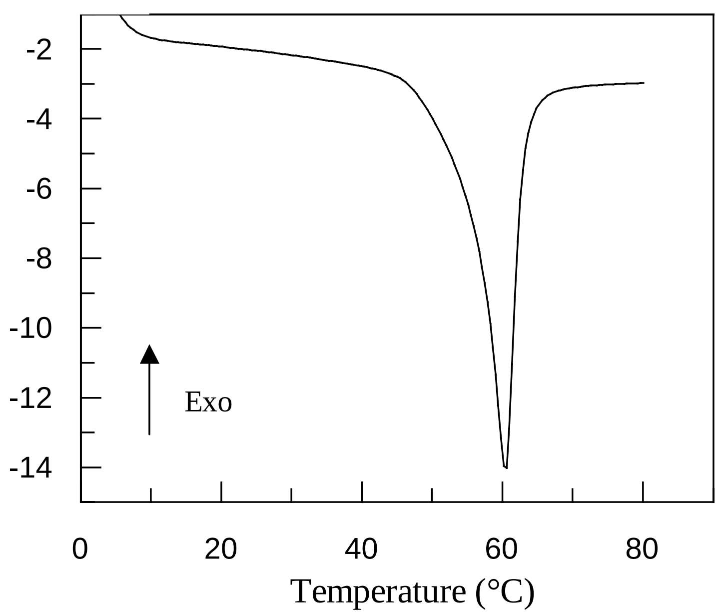
Supporting information

Sample preparation :

A 1M stock solution of water-soluble α,ω hexadiamine (Sigma, France, 98% purity) was prepared in ultrapure water. Then, the desired volume to produce the fatty acid salt (1mol fatty acid/1mol hexadiamine) was incorporated to the non-water-soluble ω-hydroxy-palmitic acid (Sigma, France, 98% purity) and 1 mL of ultrapure water was added. Samples were homogenized by vigorous vortexing and heating at 70°C for at least 30 min, plus freezing (-20 °C, 1H) and re-heating (freeze-thawing).

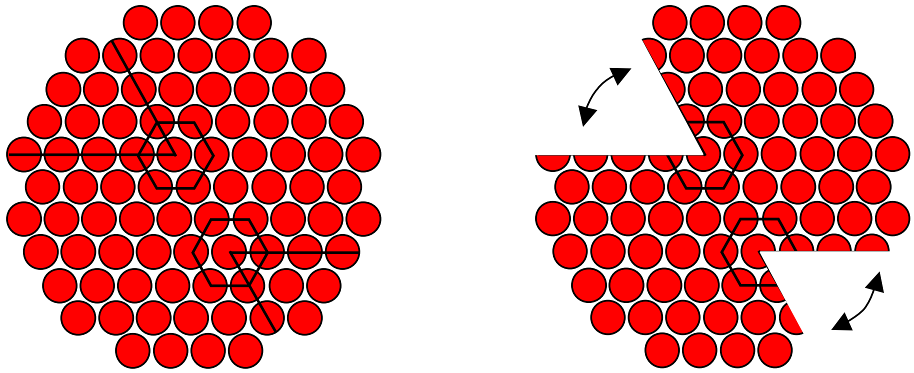
DSC :

Differential scanning calorimetry for the 1% sample. Experiments were performed on a microDSC III from Setaram (Caluire, France). The amount of 0.85 mL of the lipid solution was accurately weighed in a Hastelloy C276 vessel. The sample was scanned between 1 and 80°C upon two successive heating an cooling cycles at 1°C/min. The DSC trace from the second heating step is shown. The shoulder at around 50°C is indicative of the rotator phase as shown in ref 21.



n-pentagonal defects:

The theoretical details for the formation of disclinations are well documented in ref 12 and 26. There is two routes for forming a cone starting from an hexagonal lattice. The first is described in the manuscript as the formation of n-gonal defects, the second is briefly commented here-after as the formation of n-pentagonal defects. A cone can be obtained by introducing n-pentagonal defects at some distance from each over (Here, 2 pentagonal defects).



As for the n-gonal defects, the disclination is created by cutting-off one sector (and only one) of 60° in the n juxtaposed hexagons. Then, the cone forms by joining the two cut-edges of each hexagons leaving n pentagons (here, two pentagons).
Those two routes yield to the formation of cones having a similar structure (ref 26 for visualizing the comparison) and apex angles.