Long-Range Ordering of Highly Charged Self-Assembled Nanofilaments

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Charged nanoscale filaments are well-known in natural systems such as filamentous viruses and the cellular cytoskeleton. The unique properties of these structures have inspired the design of self-assembled nanofibers for applications in regenerative medicine, drug delivery, and catalysis, among others. We report here on an amphiphile of completely different chemistry based on azobenzene and a quaternary ammonium bromide headgroup that self-assembles into highly charged nanofibers in water and orders into two-dimensional crystals.

Figure 1. (a) Molecular structure of amphiphile 1 and schematic representation of self-assembled nanofiber. (b) Representative cryogenic TEM images of nanofibers formed by self-assembly of cation 1 (1 mM in water).