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DIRECT SYNTHESIS OF ANISOTROPIC POLYMER NANOPARTICLES BY ATRP

D.J. Adams,[a] T. He,[a] M.F. Butler,[b] C.T. Yeoh,[a] A.I. Cooper,[a] S.P. Rannard[a]

[a]*Department of Chemistry, University of Liverpool, Crown Street, Liverpool, L69 7ZD, UK*

[b]*Unilever Corporate Research, Colworth, Sharnbrook, Bedford, MK44 1LQ, UK*

The production of materials with control over structure on the nanometer scale is of fundamental importance in science and technology. Complex nanostructures are often produced by the assembly of relatively large preformed molecular building blocks. This is true both in natural biological systems and in synthetic materials. Here we demonstrate the direct synthesis of both spherical and anisotropic polymer nanoparticles with targeted shapes in the sub-100 nm size range by applying a retrosynthetic perspective.[1] This direct strategy avoids the need to build in self-assembly behavior. Our one-pot ATRP route is can be scaled up since it uses conventional polymerization techniques at high concentrations to synthesize spherical, “dumbbell-like” and “tripartite” nanoparticles directly from simple vinyl monomers. The targeted retrosynthetic approach expands the range of organic nanostructures that can be produced on a useful synthetic scale.

1. He, T.; Adams, D.J.; Butler, M.F.; Yeoh, C.T.; Cooper, A.I. Rannard, S.P. *Angew. Chem., Int. Ed.* **2007**, *46*, 9243.