

IMPLICATIONS OF MONOMER SALT STRUCTURES FOR THEIR SOLID-STATE POLYCONDENSATION TO POLYIMIDES

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The packings of colloidal objects into particle-crystals are intriguing model systems for *e.g.* crystallization process. While the packing of equal spheres yields only a handful of spherical close-packings, shape-anisotropic (*i.e.* non-spherical) objects can pack into numerous superstructures. Accessing shape-anisotropic polymer particles remains a great challenge: the few existing approaches to non-spherical homopolymer particles are limited to polymerization through photolithographic masks and deformation of spherical particles.[1,2]

We could recently synthesize anisotropic homopolymer polyimide (PI) particles of impressive size *via* solid-state polycondensation (SSP) of gel-grown monomers salt crystallites.[3] SSP generates polyimide copies of the initial monomer salt crystals, since neither melting nor premelting phenomena occur during the process. This is highly interesting as a wide range of non-spherical particle shapes become potentially accessible by manipulating the monomer salt crystal shape. For shape alteration, both precise orientation of the comonomers in the salt and the number, amount and strength of non-covalent intermolecular interactions (NCIs) are of utmost importance. We herein present a crystallographic study of the monomer salt *p*-phenylenediammonium benzene-1,4-dicarboxylic acid-2,5-dicarboxylate, highlighting the impact of the salt's structure for the SSP process.

[1] K. J. Lee *et al.*, *Curr. Opin. Colloid Interface Sci.*, **2011**, *16*, 195 – 202.

[2] D. Dendukuri, D. Pregibon, J. Collins, T. Hatton, and P. Doyle, *Nat. Mater.*, **2006**, *5*, 365 – 369.

[3] K. Kriechbaum, D. A. Cerrón-Infantes, B. Stöger, and M. M. Unterlass, *Macromolecules*, **2015**, *48*, 8773 – 8780.