

# NOVEL MONOMER SALTS AND THEIR SOLID-STATE POLYMERIZATION TO POLYIMIDES

Elias K. Bumbaris, and Miriam M. Unterlass

Institute of Materials Chemistry, Technische Universität Wien, Getreidemarkt 9/BC/2,  
1060 Vienna, Austria, [www.unterlasslab.com](http://www.unterlasslab.com)

Polyimides are polymers of the utmost thermal, chemical and mechanical stability. Therefore, they are applied in high-performance segments such as aeronautics and electronics. Structurally, their backbones comprise aromatic or aliphatic moieties connecting by – typically cyclic – imide functions. Conventional syntheses react the comonomers diamine and dianhydride to poly(amic acid) intermediates in a first step, followed by thermally induced condensation cyclizations to the final polyimide. Alternatively, one can prepare a monomer salt precursor of the comonomers, *i.e.* an ammonium carboxylate salt. Monomer salts show several advantages including (i) defined stoichiometry of the comonomers, and (ii) long term storability. Moreover, monomer salts can be transformed to polyimides by a solvent-free route: solid-state polycondensation (SSP).<sup>[1-2]</sup> Polyimides from SSP often show intriguing properties that are a direct consequence of the polymerization process, such as increased porosity,<sup>[1]</sup> and shape conservation of the initial monomer salt form.<sup>[2]</sup>

With this contribution we present novel monomer salts, including their crystal structures and structural characterization. Moreover, we study their SSP to polyimides, especially with respect to their structures, as well as the obtained polyimide products.

---

[1] M. M. Unterlass, F. Emmerling, M. Antonietti, J. Weber, *Chem. Commun.* **2014**, 50, 430-432.

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