

Supramolecular polymerizations – chirality as a muse

Bert Meijer

Institute for Complex Molecular Systems, Eindhoven University of Technology, P.O. Box 513, 5600 MB Eindhoven, the Netherlands. E-mail: e.w.meijer@tue.nl

Although the word polymer was already coined by Jöns Jakob Berzelius in 1833, it was through the pioneering work of Hermann Staudinger in 1920, that it was recognized that the macroscopic properties of polymers both in solution and solid state are the result of the macromolecular nature of the molecules. The impressive progress in supramolecular chemistry, however, paved the way to design polymers and polymeric materials that lack the macromolecular structure. Instead, highly directional secondary interactions are used to assemble the many repeating units into a polymer array. By adequate design, these systems should still have all of those material properties that make polymers so valuable and on top of that we may expect some unprecedented behavior – like self-healing - as a result of the reversibility of the supramolecular design. Multiple hydrogen bonding units will be shown to be highly attractive to produce supramolecular polymers with unique properties. Like covalent polymers, or macromolecules, the supramolecular counterparts are prepared by different mechanisms. Especially ordered arrays of monomers are highly interesting due to the cooperative nature of their supramolecular polymerization processes. These supramolecular polymers will be used to create artificial extracellular matrices, hydrogels and super-selectivity in molecular recognition. In the lecture, the concept of supramolecular polymers will be illustrated with a detailed analysis of the pathways in this non-covalent polymerizations and how these supramolecular polymers are used.



E.W. "Bert" Meijer is Distinguished University Professor in the Molecular Sciences, Professor of Organic Chemistry at the Eindhoven University of Technology and co-director of the Institute for Complex Molecular Systems. After receiving his PhD degree at the University of Groningen with Hans Wynberg, he worked for 10 years in industry (Philips and DSM). In 1991 he was appointed in Eindhoven, while in the meantime he has held part-time positions in Nijmegen Santa Barbara, CA and at the MPI in Mainz, Germany. Bert Meijer is a member of many editorial advisory boards, including *Advanced Materials* and the *Journal of the American Chemical Society*. Bert Meijer has received a number of awards, including the Spinoza Award in 2001, the ACS Award for Polymer Chemistry in 2006, the AkzoNobel Science Award 2010, the International Award of the Society of Polymer Science Japan in 2011, the Cope Scholar Award of the ACS in 2012, the Prelog Medal in 2014, the Nagoya Gold Medal in 2017 and the Chirality Medal in 2018. He is a member of a number of academies and societies, including the Royal Netherlands Academy of Science, where he is appointed to Academy Professor in 2014.