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New vistas in multisatge mass spectrometry for analysis of biodegradable polymers

Biodegradable polymers play an important role in human life, increasingly irreplaceable one. Knowledge on the relationships between their structure, properties and function is essential for prospective applications of such materials in the areas safe for human health and environment. When the development of biodegradable polymers was in its infancy the most crucial features were concentrated on the effect of macromolecular architecture, new monomer systems, polymerization mechanisms and different polymerization techniques on final biodegradable properties. Significant efforts have been directed towards specific areas, such as mechanisms of biodegradation, biocompatibility, processing conditions and potential applications in medicine, protection of environment and agro chemistry. However, such aspects like bio-safety of biodegradable polymers or nano-safety of their composites were and still are frequently neglected. In the endeavor to safe biodegradable polymers mass spectrometry methods are of particular importance in (co)polymers analyses due to their high sensitivity, selectivity, specificity and speed. Examples of the mass spectrometry studies for sequencing of biodegradable (co)polymers with the use of multi-stage electrospray mass spectrometry (ESI-MS^n) will be presented. The special emphasis will be given to the ESI-MS^n applications in the synthesis of biodegradable copolyesters as well as ESI-MSn for identification of selected biodegradable polymers on the way of molecular labeling. The attempts to solve the difficult question regarding the molecular structure of biodegradable copolymers with relation to the specific area of applied research will be also discussed.

Biography

Marek M. Kowalczuk received his Ph.D. degree in 1984 from the Faculty of Chemistry, Silesian University of Technology, and D.Sc. degree in 1994 at the same University. He was a visiting lecturer at the University of Massachusetts in Amherst, MA, U.S.A. in 1990 and Marie Curie EU fellow at the University of Bologna, Italy. Currently, he is professor at the University of Wolverhampton, UK and at the Centre of Polymer and Carbon Materials, Polish Academy of Sciences, Zabrze, Poland. He is the author and co-author of over 130 scientific papers and a score of patents.

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