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Bio-Based Polymers: Recent Progress



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S. S. Im, Y. H. Kim, J. S. Yoon, I.-J. Chin

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Preface

Plastics have been commercially produced for over sixty years now and have replaced metals and ceramics in many applications from everyday commodity products to advanced functional materials, due to their easy processibility and low density. Most people would agree that we live in an “Age of Plastics”. Packaging is one of the areas where plastics are favorably used. In particular, as the geographical separation between the producers and the consumers has been widened, efficient packaging became essential to retain the nutrients and freshness of produce and to reduce the amount of preservatives used.

Contrary to what many people think, plastics are much more environmentally benign than metals, glasses, or papers, according to the Life Cycle Assessment evaluation. However, because plastics do not degrade in nature within a reasonable time period, they tend to cast a significant threat to the environment when discarded after use. In order to protect the environment from plastics waste, it is necessary to reduce the consumption of disposable nondegradable products, such as plastics packaging, as much as possible and to recycle plastics waste. At the same time, it is crucial to substitute biodegradable plastics for nondegradable plastics. Biodegradable plastics are particularly important when the recycling of plastics waste becomes impossible or very difficult; plastics waste may be scattered about so as to deter economical recovery, they may be heavily tarnished, or their properties may be too deteriorated to be reused.

There is an ever-increasing demand for manufacturing plastics out of sustainable resources, because raw materials derived from fossil fuels are rather limited. Bio-based polymers can make excellent candidates for such materials, and they can contribute to the well-being of humankind by preserving the earth from non-degraded plastics waste. In this regard, it was timely and meaningful that the 8th World Conference on Biodegradable Polymers and Plastics (BDPP8) was held to discuss current issues and the most recent advances in biodegradable and bio-based polymers and plastics. The conference series began in 1991 as the International Scientific Consensus Workshop on Degradable Materials, and thereafter has been held almost every two years. In the BDPP8 an emphasis was placed on the industrial aspects of biodegradable plastics, and representatives of the major producers of biodegradable plastics were invited to present their most recent development activities. Government policies and regulatory issues of several countries were also addressed. The list of participants shows a broad spectrum in terms of countries represented, areas of interest, and types of organizations.

This volume contains selected papers on six different topics, namely, microbial poly(hydroxy alkanoate)s, poly(lactic acid)s, biodegradable polyesters and polyurethanes, hydrogels and biomedical applications, blends and processing, and microbial degradation. We thank the authors and referees for their contribution. We are also very grateful for the sponsorship of the International Union of Pure and Applied Chemistry, the Korea Science and Engineering Foundation, the Biodegradable Plastics Society, Japan, the Korean Biodegradable Plastics Association,

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