

BOOK REVIEW

Green Polyurethanes and Biocomposites: Molecular Design and Characterization

Authors: Hyoe Hatakeyama and Tatsuko Hatakeyama (Fukui University of Technology, Fukui, Japan, and others)

The remarkable achievements that Professors Hyoe and Tatsuko Hatakeyama have produced over their long and brilliant research careers in macromolecular materials derived from renewable resources are reflected in this comprehensive monograph, which spans a wide range of biobased polyurethanes and their composites.

This thoroughly organized book, which covers synthetic approaches, systematic characterizations of the different materials, as well as fruitful discussions of their potential applications, represents an excellent illustration of the unstoppable surge of worldwide scientific and technological interest in polymers and composites derived from the biomass, as an alternative to fossil-based counterparts.

The coverage is impressive, spanning a large number of vegetable substrates as sources of polyols, to be coupled with the complementary polyisocyanates, namely lignin, molasses, glycerol, plant oils and sericin. The ensuing optimized polyurethanes are the starting point for the elaboration of bulk, foam and hydrogel materials bearing a wide range of mechanical, thermal and rheological properties, thus covering an equally wide range of useful and promising applications.

A very important complementary set of studies completes this far-reaching collection of novel polymers, based on the incorporation of two types of fillers for the elaboration of performing composites, namely vegetable fibers or plant residues on the one hand, and mineral particles on the other hand. Again, these composites are thoroughly investigated and optimized in terms of their properties and applications, thus widening the domains and scope of potential utilizations of the previously investigated for the unfilled polyurethanes.

Quite apart from the intrinsic interest of this scientific and practical endeavor that crowns an ambitious research program spanning several decades, this book highlights the additional important aspect related to the economic valorization of “poor” vegetable residues, like tea grounds and bean-curd lees, which find a useful role among the numerous investigated composites.

Strongly believing that polymers from renewable resources are the macromolecular materials of the XXI century, I recommend this book as an excellent contribution to that working hypothesis.

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