

Starch-based polymeric materials and nanocomposites : chemistry, processing, and applications

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Abstrak

In recent years, much attention has been focused on biodegradable polymers from renewable resources. Due to its availability and low cost, starch is a promising candidate among biopolymers for use in biodegradable packaging materials and for other purposes. Starch-Based Polymeric Materials and Nanocomposites: Chemistry, Processing, and Applications presents the latest developments in starch chemistry, rheology, starch derivatives, starch-based nanocomposites, and their applications. Topics discussed include: The chemistry, microstructure, processing, and enzymatic degradation of starch The importance and role of starch as a gelling agent Plasticization and the role of plasticizers Various rheological techniques applied to starch-related products and the characteristics of starch dispersions Polymeric aspects of reactive extrusion (REX) and its use on starch and other biopolymers Cyclodextrins (CDs) and their industrial applications, and CD-based supramole and polymers The potential of starch in food packaging, edible packaging, feedstock for bioproducts, and industrial and consumer products The theoretical basis and derivation of the mathematical model for multicomponent systems and its solution algorithm The book also explores recent progress in biodegradable starch-based hybrids and nanomaterials and the incorporation of nanoparticles in starches to enhance their mechanical and thermal properties. The book concludes by discussing the use of biopolymeric nanoparticles (BNPs) in drug delivery and life cycle assessment (LCA) of starch-based polymeric materials for packaging and allied applications. With contributions from leading experts in academia and industry, this volume demonstrates the versatility of starch and its potential in a variety of applications.