

Poly(lactic acid) Science and Technology: Processing, Properties, Additives and Applications

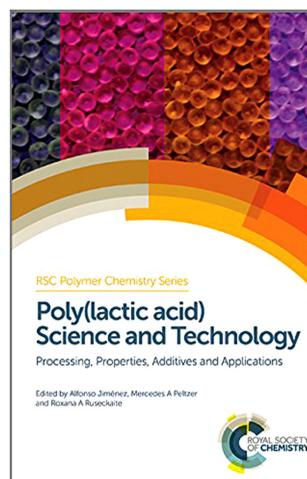
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RSC Polymer Chemistry Series 12,
Royal Society of Chemistry, UK

Year of publication: 2015

Hardcover, 353 pages

ISBN: 978-1-84973-879-8



Poly(lactic acid), PLA, is a material that is receiving considerable academic and commercial attention. As it is said in this book, this interest, according to the number of published papers, has increased exponentially over the past decade.

This book consists of fourteen chapters, divided into six parts, written by various authors reviewing the most important PLA issues.

First part (Chapters 1-3) is entitled PLA Synthesis and Polymerization. Chapter 1 covers various polymerization mechanisms of PLA synthesis as well as a variety of studied catalysts. PLA synthesis (homopolymers and stereocopolymers) and its properties in biomedical applications are covered in Chapter 2, while one of the most important polymer properties, such as crystallisation and crystallisation kinetics of different PLA, is presented in Chapter 3.

Processing and properties of PLA, as second part, are presented through four chapters. Chemical aspects of reactive extrusion processing of PLA (Chapter 4) are emphasised through their advantages and limitations. Plasticization, as an important means to improve PLA processing and properties, is covered in Chapters 4 and 5. Chapter 5 also contains a number of solubility parameters and their properties important in food packaging industry, such as the approved use as food contact materials and their specific migration limits. Developments and applications of the electrospinning of PLA and of PLA-based micro- and nanocomposites are reported in Chapter 6. Apart from plasticizers, PLA modification obtained by blending with different thermoplastics and elastomers is covered in Chapter 7.

PLA nanocomposites are also discussed through the third part (Chapters 8 and 9) of this book. A special focus is on the thermal, mechanical and barrier performances of the resulting nanocomposites.

Fourth part, entitled PLA Main Applications, is presented in two chapters (Chapters 10 and 11). Chapter 10 starts with general introduction, not necessarily related to the PLA, on antimicrobial and antioxidant active packaging. Thus readers without specialized knowledge of this topic can benefit from this chapter. The aim of Chapter 11, again after general introduction, is intended to summarise the current research of nanostructured biomaterials in tissue engineering applications. Part of this chapter (Blends) might have been better coordinated with other parts of the book, such as with Chapter 7.

Fifth part, covered in the single chapter, is entitled Degradation and Biodegradation of PLA. This chapter deals with the abiotic-hydrolytic degradation of PLA by varying the number of different parameters (*e.g.* medium conditions, PLA structure and properties).

The sixth part (Industrial and Legislative Issues) is covered in two chapters. Chapter 13 summarizes (again) the most important PLA features and gives review of the most important current applications (food packaging, automotive, biomedical and other sectors) of PLA and PLA derivatives

and nanocomposites. Chapter 14 covers legislation issues of food contact material taking into consideration biodegradation, compostability, and nanomaterials.

The book ends with the not too detailed Subject index.

Although they differ in scope and coverage, the chapters mostly fit together well. However, some chapters (and/or paragraphs within the chapters) would probably have been better placed earlier in the book to provide more compact information under a proper title.

Each chapter ends with extensive reference list, and the book contains 33 tables and 108 figures.

Most researchers in this field are likely to find something of interest here, either in an unfamiliar application of PLA or in the survey of recent publications that this book provides.

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