

Preface

Synthetic polymers are vital materials used in modern daily life from packaging, electronics, medical devices, clothing, vehicles, buildings, etc. How can a scientist or engineer synthesize and utilize polymers to solve the problems of daily life? This is the objective of this textbook to provide students with fundamental knowledge in the design and synthesis of polymers to achieve specific properties required in the applications. To have the ability to design a polymer, one has to understand the chemical structure effects on the physical and chemical characteristics of polymer first. Therefore, in this book, the first five chapters discuss the properties and characterization of polymers. Then, six chapters are followed to discuss the principles of polymerization reactions including step, radical chain, ionic chain, chain copolymerization, coordination, and ring opening. They cover the descriptions of how commonly known polymers are synthesized.

This book is intended as an introductory textbook for one semester course in polymer chemistry or polymer synthesis at the advanced undergraduate or beginning graduate level of students in chemistry, chemical engineering, and material science and engineering with no prior training in polymer. The students who uses this book should have completed undergraduate courses in organic chemistry and physical chemistry. After going through the lectures or reading the text of this book, they will have the capability to synthesize common known polymers and comprehend the advanced polymerization reactions reported in the literature to further design and synthesize new polymers.

Finally, I would like to thank the encouragement and patience obtained from my husband Cheng-Hong Su during the course of this work and the inspiration, chemical formula drawing, and proof reading from my students Chun-Chih Ho, Shih-Hsiang Lin, Tzu-Chia Huang, Shang-jung Wu, Shih-Chieh Wang, Jhin-Fong Lin, and Hsueh-Chung Liao. Thanks are also due to typing and organization of the manuscript done by Shiow-Wei Wang and drawing of figures done by Yin-Hsi Lin.

Principles of Polymer Design and Synthesis

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2013, XIII, 306 p. 480 illus., 7 illus. in color., Hardcover

ISBN: 978-3-642-38729-6