1. Record Nr. UNINA9911019594603321

Autore	Seavey Kevin Christopher
Titolo	Step-growth polymerization process modeling and product design [[electronic resource] /] / by Kevin Seavey and Y.A. Liu
Pubbl/distr/stampa	Hoboken, NJ, : Wiley, c2008
ISBN	1-282-11245-7 9786612112454 0-470-29248-2 0-470-29249-0
Descrizione fisica	1 online resource (746 p.)
Altri autori (Persone)	LiuY. A (Yih An)
Disciplina	668.9/2 668.92
Soggetti	Polymerization Engineering design
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di contenuto	STEP-GROWTH POLYMERIZATION PROCESS MODELING AND PRODUCT DESIGN; CONTENTS; FOREWORD; PREFACE; SOFTWARE SELECTION; ACKNOWLEDGMENTS; ABOUT THE AUTHORS; 1 INTRODUCTION; 1.1. Case Studies; 1.2. Need for Process Modeling; 1.3. Book Overview; PART I: FUNDAMENTALS AND APPLICATIONS OF STEP-GROWTH POLYMERIZATION PROCESS MODELING AND PRODUCT DESIGN; 2 FUNDAMENTALS OF SIMULATING STIRRED TANKS AND PLUG-FLOW REACTORS; 2.1. Simulating Stirred Tanks; 2.2. Simulating Plug-Flow Reactors; 2.3. Closing Remarks; 2.4. Appendix: Basic Numerical Methods for Integrating Ordinary Differential Equations 2.5. Appendix: FORTRAN CodesReferences; 3 PHYSICAL PROPERTIES; 3.1. Design Problem: Estimating Residence Time; 3.2. Introduction; 3.3. Physical Properties of Conventional Components; 3.4. Physical Properties of Polymers; 3.5. Solution to the Design Problem; 3.6. Closing Remarks; 3.7. Appendix: FORTRAN Codes; 3.8. Appendix: Van Krevelen's Method; References; 4 PHASE EQUILIBRIUM AND MASS TRANSFER; 4.1. Design Problems; 4.2. Introduction; 4.3. Phase Equilibrium; 4.4. Diffusional Mass Transfer; 4.5. Estimating Mass-

Transfer Coefficients; 4.6. Boiling Mass Transfer
4.7. Solution to the Design Problem4.8. Closing Remarks; 4.9. Appendix: FORTRAN Codes; References; 5 REACTION KINETICS; 5.1. Design Problems; 5.2. Introduction; 5.3. Functional-Group Approach and the Method of Moments; 5.4. Nylon-6 Polymerization; 5.5. Poly (Ethylene Terephthalate) Polymerization; 5.6. Solution to Design Problems; 5.7. Closing Remarks; 5.8. Appendix: Codes; References; 6 ENTHALPY CALCULATIONS; 6.1. Design Problem: Polymer Drying; 6.2. Introduction; 6.3. Physical Properties Pertinent to Enthalpy; 6.4. Rigorous Enthalpy Calculations; 6.5. Solution to Design Problem 6.6. Closing Remarks6.7. Appendix: Codes; References; 7 STIRRED TANKS; 7.1. Design Problems; 7.2. Introduction; 7.3. Stirred-Tank Equations; 7.4. Solution to Design Problems; 7.5. Closing Remarks; 7.6. Appendix: Codes; References; 8 PLUG-FLOW REACTORS; 8.1. Design Problems; 8.2. Introduction; 8.3. Liquid PFR; 8.4. Liquid PFR, Well-Mixed Vapor Phase; 8.5. Liquid PFR, Countercurrent Liquid Phase; 8.6. Liquid PFR, Countercurrent Vapor Phase; 8.7. Solution to Design Problems; 8.8. Closing Remarks; 8.9. Appendix: Codes; References; 9 FLOWSHEET SIMULATION; 9.1. Design Problems; 9.2. Introduction 9.3. A Simple Example9.4. Single Unit Operation Example; 9.5. Solution to Design Problems; 9.6. Closing Remarks; 9.7. Appendix: Codes; PART II: MODELING STEP-GROWTH POLYMERIZATION PROCESSES AND PROPERTIES USING POLYMERS PLUS AND ASPEN CUSTOM MODELER; 10 NYLON-6 VK-TUBE SIMULATION IN POLYMERS PLUS; 10.1. Process Description; 10.2. Developing the Model; 10.3. Applying the Model; 10.4. Closing Remarks; 10.5. Appendix: Model Input Form; Reference; 11 NYLON-6 LEACHER AND SOLID-STATE POLYMERIZATION SIMULATION IN ASPEN CUSTOM MODELER; 11.1. Process Description 11.2. Overview of Aspen Custom Modeling

Sommario/riassunto

Understand quantitative model step-growth polymerization plans and how to predict properties of the product polymer with the essential information in Step-Growth Polymerization Process Modeling and Product Design. If you want to learn how to simulate step-growth polymerization processes using commercial software and seek an in-depth, quantitative understanding of how to develop, use, and deploy these simulations, consult this must-have guide. The book focuses on quantitative relationships between key process input variables (KPIVs) and key process output variables (KPOVs), and the integ