1. Record Nr. UNINA9910830131703321

Autore	Elkamel Ali
Titolo	Chemical product formulation design and optimization : methods, techniques, and case studies / / Ali Elkamel, [and four others]
Pubbl/distr/stampa	Weinheim, Germany : , : Wiley-VCH GmbH, , [2023] ©2023
ISBN	3-527-68963-X 3-527-68962-1
Descrizione fisica	1 online resource (227 pages)
Disciplina	737
Soggetti	Chemical engineering
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Cover -- Title Page -- Copyright -- Contents -- Preface -- About the Authors -- Chapter 1 Introduction -- 1.1 Chemical Product Engineering -- 1.2 Chemical Product Design -- 1.3 Product Design and Computer Aided Product Design -- References -- Chapter 2 Some Typical Applications of Chemical Product Design and Intellectual Property -- 2.1 Natural Fiber Plastic Composites -- 2.2 Wheat Straw Polypropylene Composites -- 2.3 Modeling Natural Fiber Polymer Composites -- 2.4 Graphene Composites -- 2.5 Corrosion Protection Using Polymer Composites -- 2.6 Intellectual Property -- References -- Chapter 3 Mathematical Principles for Chemical Product Design -- 3.1 Factorial and Fractional Factorial Design -- 3.2 Response Surface Methods and Designs -- 3.3 DOptimal Designs -- 3.4 Bayesian Design of Fractional Factorial Experiments -- 3.5 Regression Analysis -- 3.6 Artificial Neural Networks -- 3.7 Mixture Design of Experiments -- 3.8 Multiway Principal Component Analysis -- 3.8.1 Modelbased Principal Component Analysis (MBPCA) -- 3.8.2 MPLS Analysis Using NIPALS -- References -- Chapter 4 Disinfectant Formulation Design -- 4.1 Introduction -- 4.2 Disinfectants Characteristics -- 4.2.1 Antimicrobial Tests -- 4.2.2 Stability Tests -- 4.2.3 Corrosion Tests -- 4.3 Toxicity of Disinfectants -- 4.3.1 Harmful (Xn) -- 4.3.2 Severe Eye Damage, Xi (R41) -- 4.3.3 Eye Irritant, Xi (R36) -- 4.3.4 Skin Irritant, Xi (R38) -- 4.3.5 Respiratory Irritant, Xi (R37) -- 4.4 Experimental Design for

Antimicrobial Activity -- 4.4.1 Prior Knowledge -- 4.4.2 Historical Data Augmentation -- 4.4.3 Linear Least Squares Regression Analysis -- 4.4.4 Artificial Neural Networks -- 4.5 Experimental Design for Stability of Hydrogen Peroxide -- 4.5.1 Historical Data Analysis -- 4.5.2 Historical Data Augmentation Using Bayesian Doptimality Approach -- 4.6 Experimental Design for Corrosion.
4.6.1 Preliminary Experimental Design -- 4.6.2 Response Surface Methodology -- 4.6.3 Artificial Neural Networks -- 4.7 Final Formulation Optimization -- 4.7.1 Optimization -- 4.7.2 Optimized Formulation Verification -- 4.7.3 Comparing the Optimized Formulations to an Available Product -- 4.8 Conclusion -- References -- Chapter 5 Streptomyces Lividans 66 for developing a Minimal Defined Medium for Recombinant Human Interleukin3 -- 5.1 Introduction -- 5.2 Materials and Methods -- 5.2.1 Microorganism and Medium -- 5.2.2 Analytical Methods -- 5.2.3 Experimental Design and Data Analysis -- 5.3 Results and Discussion -- 5.3.1 Starvation Trails -- 5.3.2 Screening Mixture Experiments -- 5.3.3 Defined Medium Optimization by Mixture Design Method -- 5.4 Conclusion -- References -- Chapter 6 Multivariate Modeling of a Chemical Toner Manufacturing Process -- 6.1 Introduction -- 6.1.1 Process and Data Description -- 6.1.2 Model CrossValidation -- 6.2 Results and Discussion -- 6.3 Conclusion -- References -- Chapter 7 Wheat Straw Fiber Size Effects on the Mechanical Properties of Polypropylene Composites -- 7.1 Introduction -- 7.2 Materials and Methods -- 7.2.1 Materials -- 7.2.2 Fiber Preparation and Size Measurement -- 7.2.3 Fiber Thermal and Chemical Analysis -- 7.2.4 Composite Sample Preparation and Properties Measurement -- 7.3 Results and Discussions -- 7.3.1 Fiber Fractionation and Size Measurement -- 7.3.2 Fiber Thermal and Chemical Analysis -- 7.3.3 Fiber Size Reduction During Compounding Process -- 7.3.4 Composite Flexural Properties -- 7.3.5 Composite Impact Properties -- 7.3.6 Composite Specific Properties -- 7.4 Conclusion -- References -- Chapter 8 Framework for Product Design of Wheat Straw Polypropylene Composite -- 8.1 Introduction -- 8.2 Product Design Framework for WSPP Composite -- 8.3 Response Surface Models.
8.3.1 The Design of Mixture Experiment -- 8.3.2 Materials and Methods -- 8.3.3 Results and Discussion -- 8.3.3.1 Flexural Modulus -- 8.3.3.2 Izod Impact Strength -- 8.3.3.3 Other Properties -- 8.4 Case Study -- 8.5 Conclusion -- References -- Chapter 9 Product Design for Gasoline Blends to Control Environmental Impact Using Novel Sustainability Indices: A Case Study -- 9.1 Introduction -- 9.2 Methodology -- 9.2.1 The Impacts of Gasoline Blends on Octane Number (ON) -- 9.2.2 The Impacts of Blending Ethanol and Gasoline on Mileage -- 9.2.3 The Effects of Ethanol, Methanol, and Isooctane on the Octane Number of Gasoline Blends -- 9.2.4 The Impacts of E5, M5, and I5 on Heat Value, Mileage, and Price -- 9.2.5 Impacts of E5, M5, and I5 on Environment in Potential Environmental Impacts (PEIs) -- 9.2.6 The Impacts of E5, M5, and I5 on Safety Risk -- 9.2.7 Selecting the Best Blend Through the Analytic Hierarchy Process (AHP) -- 9.3 Results -- 9.4 Conclusion -- References -- Chapter 10 Corrosion Protection of Copper Using Polyetherimide/Graphene Composite Coatings -- 10.1 Introduction -- 10.2 Experimental -- 10.2.1 Material -- 10.2.2 Composite Preparation, Coating, and Curing -- 10.2.3 Morphology Characterization -- 10.2.4 Adhesion -- 10.2.5 Electrochemical Measurement -- 10.3 Results and Discussion -- 10.3.1 Morphology -- 10.3.2 Adhesion -- 10.3.3 Potentiodynamic Measurements -- 10.3.4 Impedance -- 10.4 Conclusion -- References -- Chapter 11 Optimization of Mechanical Properties of Polypropylene

Montmorillonite Nanocomposites -- 11.1 Introduction -- 11.2 Methodology -- 11.3 Mathematical Models -- 11.4 Optimization Mechanism -- 11.5 Results and Discussion -- 11.5.1 Minimizing the Cost of PPOMMT -- 11.5.2 Minimizing the Variance Between Desired Properties -- 11.6 Conclusion -- References.
Chapter 12 Product Selection and Business Portfolio for LongRange Financial Stability: Case Study from the Petrochemical Industry -- 12.1 Introduction -- 12.2 Manufacturing Strategy and Product Selection Tools -- 12.3 Model Development -- 12.4 Illustrative Case Study -- 12.5 Conclusion -- References -- Index -- EULA.