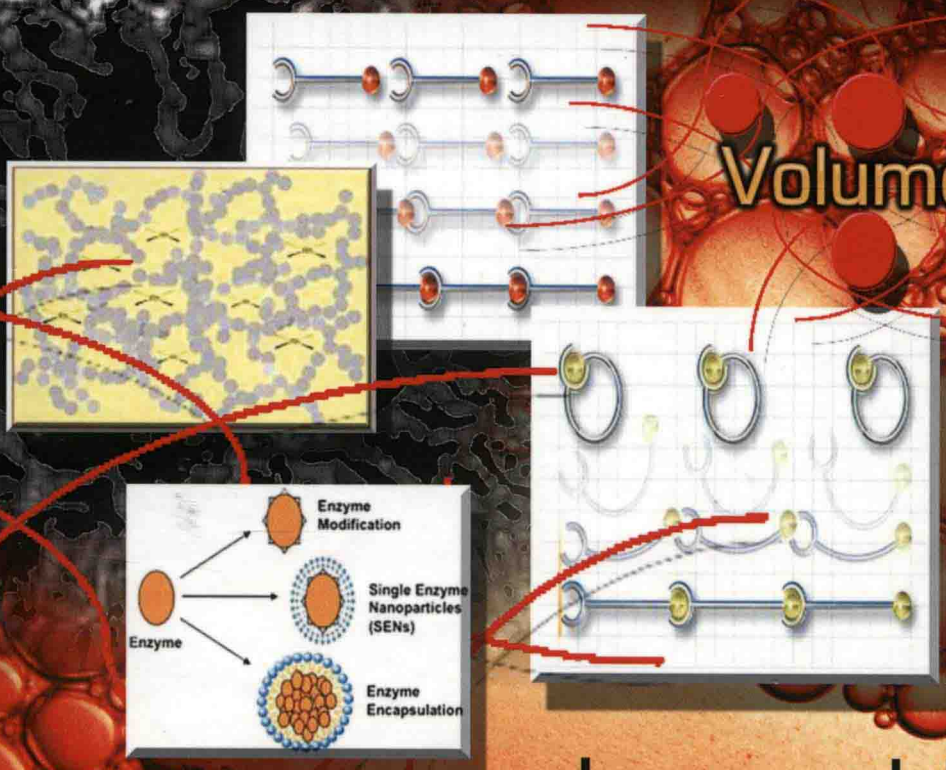
Advanced Functional Polymers and Composites

Materials, Devices and Allied Applications

Volume 1



Inamuddin
Editor

Polymer Science and Technology

NOVA

POLYMER SCIENCE AND TECHNOLOGY

ADVANCED FUNCTIONAL POLYMERS AND COMPOSITES

MATERIALS, DEVICES AND ALLIED APPLICATIONS

VOLUME 1

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DEDICATION

To my parents,
my wife Mrs. Khushbu Inam and
my loving son Mohammad Uzair Khan

PREFACE

Polymers and their composites have in fact percolated every aspect of our daily life. The extensive use of polymers and their composites in the manufacturing of basic utilities starting from carrying bags to engineered materials has revolutionized the human life style as well as the industrial scenario. The usage of polymers and composites has deeply influenced the development of modern technological societies leading to a high standard of living. Cutting edge research is being carried out to develop and deploy polymers and their composites in critical areas of human endeavor such as medicine, medical appliances, energy and environment. Engineered materials using advanced polymers and their composites are finding extensive use in sectors like automotives, aerospace, electronics, and electrical devices. The Advanced Functional Polymers and Composites: Materials, Devices and Allied Applications vol 1 and vol 2 have been compiled to broadly explore the latest developments in the field of polymeric and composite materials.

These two volumes of book edition will prove to be highly useful for various disciplines of science, engineering, biomedicine, dental medicine, orthopedics, nanotechnology, biomedical engineering, etc.

Volume 1, hopefully, will evoke interest from scientists working in the fields of chemistry, polymer chemistry, electrochemistry, material science including polymer electrolyte membrane fuel cells, sensors, actuators, coatings, electrochromic and electroluminescent materials, magnetic polymers, organo-metallic polymers, tissue engineering, method of immobilization of biological molecules, dental and orthopedic applications, etc. Based on thematic topics, volume 1 contains the following 12 chapters:

Chapter 1: In this chapter, the recent developments in the polymer electrolyte membranes (PEMs) for high temperature-polymer electrolyte membrane fuel cells are reviewed, with attention paid to the fast growing and promising PEM materials obtained by acid doping. PEM materials involving various modifications of commercial perfluorosulfonic acid (PFSA) membranes are also discussed.

Chapter 2: This comprehensive chapter attempts to assimilate the entire panorama of research devoted to surface confined Ru/Os polypyridyl complexes as prototypes for electrochromic materials.

Chapter 3: This chapter provides a review of the fundamentals of magnetic polymer nanocomposites. The processing methods and approaches utilized in the preparation of the magnetic polymer nanocomposite materials are also surveyed.

Chapter 4: In this chapter the developments of polyether amide coating materials by the utilization of different vegetable seed oils are reviewed.

Chapter 5: This chapter provides a brief overview of the historical background and applications of electroluminescent devices based on advanced functional polymers and composite materials.

Chapter 6: In this chapter, recent developments of pH-sensitive actuators based on poly(methacrylic acid) and poly(itaconic acid) are presented.

Chapter 7: In this chapter, development of cell scaffolds fabrication technology and its application for tissue engineering are discussed.

Chapter 8: In this chapter, methods of immobilization of lipase by physical adsorption on selective polymers are discussed.

Chapter 9: This chapter discusses the applications of solemulsions technology in drug delivery systems.

Chapter 10: In this chapter, the current state of acrylic denture base-materials and their application are reviewed.

Chapter 11: This chapter reviews the biomaterials used for manufacturing orthopedic implants. Some methods for performance enhancement techniques of orthopedic implants are also discussed.

Chapter 12: Advances in dental restorative composite materials are discussed in this chapter.

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