

Contents

Aim and Scope — VII

Acknowledgment — IX

Preface — XI

List of Contributing Authors — XIII

Gourhari Chakraborty and Arbind Prasad

1 Bio-based materials: origin, synthesis, and properties — 1

Nipun Jain, Yusuf Olatunji Waidi, Ranjit Barua, Vilay Vannaladsaysy, Samir Das, Arbind Prasad, Dileep Pathote, and Sudipto Datta

2 Bio-based polymers: processing and applications — 25

Yusuf Olatunji Waidi, Nipun Jain, Ranjit Barua, Samir Das, Vilay Vannaladsaysy, Arbind Prasad, Dileep Pathote, and Sudipto Datta

3 Cellulose: biomedical and engineering applications — 43

Varatharajan Prasannavenkadesan, Syed Naveed Ul Meiraj, K. B. Badri Narayanan, S. Ram Prasanth, and Arbind Prasad

4 Chitosan in orthopedics: current advancements and future prospects — 59

Prateek Mishra, Shravan Kumar, Abhishek Kumar Maurya, Pratishtha Tiwari, Shreya Tirkey, and Surbhi Sharma

5 Bio-based materials in drug delivery — 79

Sriparna De, Adrija Ghosh, Madhurima Basak, Arbind Prasad, and Dipankar Chattopadhyay

6 Prospects of functional nano-manufactured scaffolds in tissue engineering applications — 107

Ruchin Kacker, Sanjay Kumar Singh, and Ravishanker V. Choudri

7 Additive manufacturing in fabrication of orthopedic implants — 127

Sudarshan Dhua, Arindam Nath, and Rakesh Kumar

8 Analysis of surface acoustic wave in a polymer-coated piezo-electro-magnetic structure with micro-inertia effect — 163

Pradip Das and Gourhari Chakraborty

- 9 Biodegradable polymers-based proton exchange membrane for fuel cells — 183**

Barnali Bhui and Rupam Sinha

- 10 Bio-based carbon materials for applications in supercapacitors: an energy storage system — 193**

Vishnuvarthanan Mayakrishnan and Asha Anish Madhavan

- 11 Bio-based materials in advanced packaging applications — 205**

Vijyendra Kumar, Sushil Kumar Verma, Sonika, Pratima Rani Singh, Ghanshyam Barman, and Gamini Sahu

- 12 Biorefinery development feedstocks derived and possible solutions for a sustainable environment — 233**

Atanu Kumar Paul and Sutapa Das

- 13 Biolubricants and its application in engineering — 271**

Pankaj Boruah and Arbind Prasad

- 14 Bio-based materials in advance separation processes — 297**

Sudarshan Dhua, Arpita Maji, and Subrata Mondal

- 15 The influence of imperfect interface of shear wave propagation on layered bio-based plate material: computational study of bio-based systems — 319**

Gourhari Chakraborty, Pradip Das, and Arbind Prasad

- 16 Bio-based materials for adsorption and catalysis — 333**

About the editors — 345

Index — 347