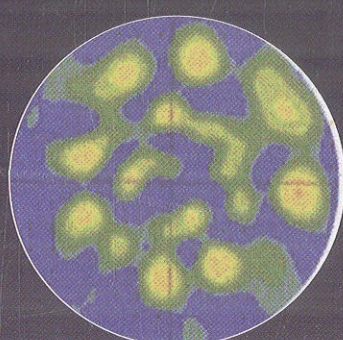
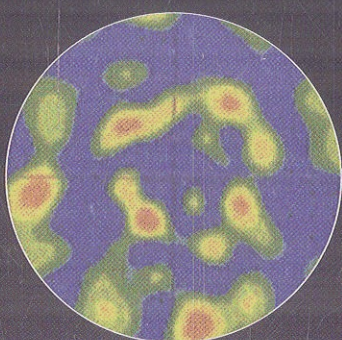
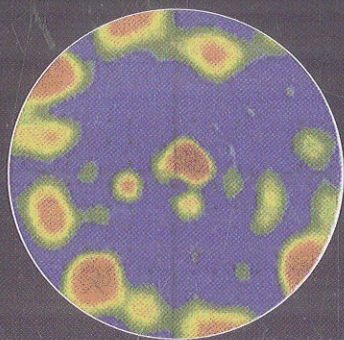


ADVANCED BIOMATERIALS

Fundamentals, Processing, and Applications



Edited by
BIKRAMJIT BASU
DHIRENDRA S. KATTI
ASHOK KUMAR

 WILEY

The
American
Ceramic
Society 

CONTENTS

Foreword (by Prof. Larry L. Hench)	ix
Preface	xi
Contributors	xv
About the Editors	xxi

SECTION I

1 FUNDAMENTALS OF BIOMATERIALS AND BIOCOMPATIBILITY <i>Bikramjit Basu and Shekhar Nath</i>	3
2 FUNDAMENTALS OF HYDROXYAPATITE AND RELATED CALCIUM PHOSPHATES <i>Racquel Zapanta LeGeros, Atsuo Ito, Kunio Ishikawa, Toshiro Sakae, and John P. LeGeros</i>	19
3 MATERIALS FOR ORTHOPEDIC APPLICATIONS <i>Shekhar Nath and Bikramjit Basu</i>	53
4 THE MICRO MACROPOROUS BIPHASIC CALCIUM PHOSPHATE CONCEPT FOR BONE RECONSTRUCTION AND TISSUE ENGINEERING <i>Guy Daculsi, Franck Jegoux, and Pierre Layrolle</i>	101
5 SCIENCE AND TECHNOLOGY INTEGRATED TITANIUM DENTAL IMPLANT SYSTEMS <i>Yoshiki Oshida and Elif Bahar Tuna</i>	143

6	INJECTABLE HYDROGELS AS BIOMATERIALS	179
	<i>Lakshmi S. Nair, Cato T. Laurencin, and Mayank Tandon</i>	
7	NANOMATERIALS FOR IMPROVED ORTHOPEDIC AND BONE TISSUE ENGINEERING APPLICATIONS	205
	<i>Lijie Zhang, Sirinrath Sirivisoot, Ganesh Balasundaram, and Thomas J. Webster</i>	
SECTION II		
8	INTRODUCTION TO PROCESSING OF BIOMATERIALS	245
	<i>Dhirendra S. Katti, Shaunak Pandya, Meghali Boru, and Rakesh Mahida</i>	
9	LASER PROCESSING OF ORTHOPEDIC BIOMATERIALS	277
	<i>Rajarshi Banerjee and Soumya Nag</i>	
10	FUNCTIONALLY GRADED ALL CERAMIC HIP JOINT	323
	<i>Omer Van der Biest, Guy Anné, Kim Vanmeensel, and Jef Vleugels</i>	
11	MEDICAL DEVICES BASED ON BIOINSPIRED CERAMICS	357
	<i>Pío González, Julián Martínez-Fernández, Antonio R. de Arellano-López, and Mrityunjay Singh</i>	
12	IONOMER GLASSES: DESIGN AND CHARACTERIZATION	411
	<i>Artemis Stamboulis and Fei Wang</i>	
13	DESIGNING NANOFIBROUS SCAFFOLDS FOR TISSUE ENGINEERING	435
	<i>Neha Arya, Poonam Sharma, and Dhirendra S. Katti</i>	
14	DESIGN OF SUPERMACROPOROUS BIOMATERIALS VIA GELATION AT SUBZERO TEMPERATURES—CRYOGELATION	499
	<i>Fatima M. Plieva, Ashok Kumar, Igor Yu. Galaev, and Bo Mattiasson</i>	

SECTION III

- 15** **BIOMATERIAL APPLICATIONS** 535
Ashok Kumar, Akshay Srivastava, and Era Jain
- 16** **CELL-BASED NANOCOMPOSITES AND BIOMOLECULES FOR BONE TISSUE ENGINEERING** 551
Michelle Ngiam, Susan Liao, Casey Chan, and S. Ramakrishna
- 17** **ORTHOPEDIC INTERFACE TISSUE ENGINEERING: BUILDING THE BRIDGE TO INTEGRATED MUSCULOSKELETAL TISSUE SYSTEMS** 589
Helen H. Lu, Kristen L. Moffat, and Jeffrey P. Spalazzi
- 18** **CELLS OF THE NERVOUS SYSTEM AND ELECTRICAL STIMULATION** 613
Carlos Atico Ariza and Surya K. Mallapragada
- 19** **PLACENTAL UMBILICAL CORD BLOOD: A TRUE BLOOD SUBSTITUTE** 643
Niranjan Bhattacharya
- 20** **SUPPORTED CELL MIMETIC MONOLAYERS AND THEIR BLOOD COMPATIBILITY** 663
K. Kaladhar and Chandra P. Sharma
- 21** **TITANIUM NITRIDE AND DIAMOND LIKE CARBON COATINGS FOR CARDIOVASCULAR APPLICATIONS** 677
C.V. Muraleedharan and G.S. Bhuvaneshwar
- INDEX** 707