

# ADVANCES IN MATERIALS ENGINEERING

---

## Volume 1

Edited By:  
Zahurin Halim  
Iskandar Idris Yaacob  
Md Abdul Maleque



IIUM PRESS

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

# **ADVANCES IN MATERIALS ENGINEERING VOLUME 1**

Edited By:

Zahurin Halim  
Iskandar Idris Yaacob  
Md Abdul Maleque



**IIUM Press**

Published by:  
IIUM Press  
International Islamic University Malaysia

First Edition, 2011  
©IIUM Press, IIUM

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without any prior written permission of the publisher.

Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

ISBN: 978 -967-418-167-3

Member of Majlis Penerbitan Ilmiah Malaysia – MAPIM  
(Malaysian Scholarly Publishing Council)

Printed by :  
**IIUM PRINTING SDN. BHD.**  
No. 1, Jalan Industri Batu Caves 1/3  
Taman Perindustrian Batu Caves  
Batu Caves Centre Point  
68100 Batu Caves  
Selangor Darul Ehsan

# Table of Content

<b>Chapter 1</b> Preparation and Characterization of Thermoplastic Natural Rubber (TPNR) Nanocomposites <i>Noor Azlina Hassan, Sahrim Hj. Ahmad, Rozaidi Rasid and Norita Hassan</i>	1
<b>Chapter 2</b> Polymer Clay Nanocomposites: Part I <i>Noor Azlina Hassan and Norita Hassan</i>	6
<b>Chapter 3</b> Effect of Processing Parameters on the Tensile Properties of TPNR Reinforced Short Carbon Fibre Composite <i>Hazleen Anuar, Sahrim Hj. Ahmad and Rozaidi Rasid</i>	11
<b>Chapter 4</b> Effect of Maleic Anhydride Polyethylene on Damping Properties of HDPE/EPDM Nanocomposite <i>Hazleen Anuar, Nur Ayuni Jama, and Shamsul Bahri Abdul Razak</i>	16
<b>Chapter 5</b> Comparative Study on the Effect of Plasticizer on Thermal Properties of Polylactic Acid <i>Hazleen Anuar and Muhammad Rejaul Kaiser</i>	22
<b>Chapter 6</b> Quality of Copper Film Electroplated on Silicon Wafer Using Different Current Densities <i>Shahjahan Mridha</i>	28
<b>Chapter 7</b> Laser Nitriding of Titanium <i>Shahjahan Mridha</i>	39
<b>Chapter 8</b> Composite Coating on Titanium Alloy Using High Power Laser <i>Shahjahan Mridha</i>	45

<b>Chapter 9</b>		
Measurement of Moisture Absorption in Borophosphosilicate Glass (BPGS) Films		50
	<i>Shahjahan Mridha and Shiau Khee Tang</i>	
<b>Chapter 10</b>		58
The Effect of Processing Parameter on Tensile Properties of Thermoplastic Natural Rubber Nanocomposites		
	<i>Noor Azlina Hassan, Sahrim Hj. Ahmad, Rozaidi Rasid and Norita Hassan</i>	
<b>Chapter 11</b>		64
Comparison of Mechanical Properties Between Untreated and Sulphuric Acid Treated Short Carbon Fiber Reinforced Thermoplastic Natural Rubber (TPNR) Composite		
	<i>Noor Azlina Hassan, Norita Hassan, Sahrim Hj. Ahmad and Rozaidi Rasid</i>	
<b>Chapter 12</b>		69
Water Absorption of TPNR Reinforced Short Carbon Fibre Composite		
	<i>Hazleen Anuar, Sahrim Hj. Ahmad and Rozaidi Rasid</i>	
<b>Chapter 13</b>		74
Enhanced Tensile Strength with Sulphuric Treated Short Carbon Fibre		
	<i>Hazleen Anuar, Sahrim Hj. Ahmad and Rozaidi Rasid</i>	
<b>Chapter 14</b>		79
Effect of Fibre Length on Tensile Properties of TPNR-Kenaf Fibre Composite		
	<i>Hazleen Anuar, Sahrim Hj. Ahmad and Rozaidi Rasid</i>	
<b>Chapter 15</b>		84
Effect of Nanoclay on Mechanical Properties of PLA-Clay Nanocomposite		
	<i>Hazleen Anuar and Muhammad Rejaul Kaiser</i>	
<b>Chapter 16</b>		90
Extraction of Glucose From Kenaf Core by Using Chemical Pre – Treatment Process		
	<i>Nurhafizah Seeni Mohamed, Hazleen Anuar, Maizirwan Mel, Rashidi Othman, Nur Aisyah Mohd Norddin, Nur Aimi Mohd Nasir, Mohd Adlan Mustafa Kamalbhrrin</i>	
<b>Chapter 17</b>		96
Wear of Nitride Coating Produced by Ti-Al Melt Synthesis in Nitrogen Environment		
	<i>Shahjahan Mridha</i>	
<b>Chapter 18</b>		103
Effect of Dispersant on Protein Foaming-Consolidation Porous Alumina Containing Hydrothermal Derived Hydroxyapatite Nanopowder		
	<i>Iis Sopyan and Ahmad Fadli</i>	

<b>Chapter 19</b>	109
Effect of Yolk Addition on Protein Foaming-Consolidation Porous Alumina-Calcium Phosphate Composites	
	<i>Iis Sopyan and Ahmad Fadli</i>
<b>Chapter 20</b>	115
Investigation of the Effect of Starch Addition on Protein Foaming-Consolidation Porous Alumina Containing Hydroxyapatite Nanopowder	
	<i>Ahmad Fadli', Iis Sopyan, Nur Syahidah and Nur Nadia</i>
<b>Chapter 21</b>	120
The Influence of Hydroxyapatite Loading on Protein Foaming-Consolidation Porous Alumina Sintered at 1300°C	
	<i>Ahmad Fadli 'and Iis Sopyan</i>
<b>Chapter 22</b>	126
High Density Polyethylene (HDPE) as an Alternative Material in Fuel Tank Production	
	<i>Afiqah Afdzahuddin and Md Abdul Maleque</i>
<b>Chapter 23</b>	132
Porous Alumina-Hydroxyapatite Composites via Protein Foaming-Consolidation Method: Effect of HA Loading on Physical Properties	
	<i>Iis Sopyan, Ahmad Fadli and Nur Izzati Zulkifli</i>
<b>Chapter 24</b>	137
Preparation and Characterisation of Low Density Polyethylene/Layered Silicate Nanocomposites	
	<i>Salina Sharifuddin , Iskandar Idris Yaacob</i>
<b>Chapter 25</b>	144
Effects of Sodium Dodecyl Benzene Sulphonate (NaDBs) on Li Imide-PMMA Based Solid Polymer Electrolyte	
	<i>Fauziah Mohd Yusof and Iskandar Idris Yaacob</i>
<b>Chapter 26</b>	149
Effect of Milling Time on Mechanochemically Synthesized Nanohydroxyapatite Bioceramics	
	<i>Iis Sopyan, S. Adzila and M. Hamdi</i>
<b>Chapter 27</b>	
Morphological Analysis of Mechanochemically Synthesized Nanohydroxyapatite Bioceramics	155
	<i>Iis Sopyan, S. Adzila and M. Hamdi</i>
<b>Chapter 28</b>	160
Sodium Doped Nanohydroxyapatite Bioceramics through Mechanochemical Synthesis	
	<i>S. Adzila, Iis Sopyan and M. Hamdi</i>

<b>Chapter 29</b>	165
Thermal Profile Analysis of Composite Brake Rotor	
<i>Md Abdul Maleque and Abdul Mu'min Adebisi</i>	
<b>Chapter 30</b>	172
The Effect of Fibre Content on Thermal Property of Coir Fibre Reinforced Cement-Albumen Composite	
<i>Faridatul Faezah Razali, Nur Humairah Abdul Razak and Zuraida Ahmad</i>	
<b>Chapter 31</b>	178
Pulsed Electrodeposition	
<i>Suryanto</i>	
<b>Chapter 32</b>	184
Electroless Nickel Based Coatings From Solution Containing Sodium Hypophosphite	
<i>Suryanto</i>	
<b>Chapter 33</b>	189
Characterization and Utilization of Fly Ash	
<i>Suryanto</i>	
<b>Chapter 34</b>	195
Workability of Coir Fibre- Reinforced Cement-Albumen Composite	
<i>Nur Humairah Abdul Razak and Zuraida Ahmad</i>	
<b>Chapter 35</b>	201
Preparation of Rice Husk for Raw Material of Silicon	
<i>Hadi Purwanto and Nor Fazilah Mohd Selamat</i>	