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Intelligent Manufacturing and Mechatronics

Selected Articles from iM3F 2023, 7–8 August, Pekan, Malaysia

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Preface

The fourth edition forum of the Innovative Manufacturing, Mechatronics and Materials Forum 2023 (iM3F 2023) organized by Universiti Malaysia Pahang Al-Sultan Abdullah through its Faculty of Manufacturing and Mechatronic Engineering Technology was held on 7 and 8 August 2023. The main field focuses on Manufacturing, Mechatronics as well as Materials.

About 95 submissions were received during iM3F 2023 and were reviewed in a single-blind manner, and 48 papers were advocated by the reviewers to be published in this Springer Proceedings of Materials. The editors would like to express their gratitude to all the authors who submitted their papers. The paper published in this proceeding has been thoroughly reviewed by the appointed technical review committee which consists of various experts in the field of materials and manufacturing engineering.

The conference had brought a new outlook on cutting-edge issues shared through keynote speeches by Assoc. Prof. Ir. Dr. Haji Nik Mohd Zuki Nik Mohamed, Prof. Eng Hwa Yap and Prof. Gian Antonio Susto.

Finally, the editors hope that readers find this volume informative as we thank Springer Proceedings in Materials for undertaking this volume publication. We also would like to thank the conference organization staff and the international program committees' members for their hard work.

Pekan, Pahang, Malaysia
November 2022

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Abstract

The utilization of carbon nanotube-reinforced polymer composites (CNT-RPCs) has been recognized as a significant breakthrough in the field of material science, owing to their exceptional amalgamation of characteristics. The incorporation of carbon nanotubes (CNTs) into a polymer matrix results in a composite material that combines the notable mechanical strength, electrical conductivity, and thermal stability exhibited by CNTs with the inherent flexibility of polymers. The process of integration leads to the development of improved composite materials that are suitable for a wide range of applications, and possess the ability to modify their properties according to specific application requirements. CNT-RPCs have established a distinct position within the field of biomedicine, specifically in the domains of bone implantation, tissue engineering, regenerative medicine, and drug delivery. These cells offer notable benefits including biocompatibility, electrical conductivity, and efficient drug distribution. Moreover, the incorporation of carbon nanotubes (CNTs) into polymers has demonstrated significant advancements in the fields of electronics, aerospace, and medicine. Cutting-edge modeling techniques utilizing deep learning are currently being implemented to enhance and

optimize these composite materials. The present analysis provides an in-depth exploration of the advancement, attributes, and utilization of carbon nanotube-reinforced polymer composites (CNT-RPCs) in the field of biomedicine. Notably, recent advancements, obstacles, and prospects pertaining to this revolutionary material are emphasized.

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