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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

Radhiyah Abd. Aziz
Zulhelmi Ismail
A. K. M. Asif Iqbal
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Contents

Current Developments and Future Prospects in Vehicle Tire Technologies: A Review

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Abstract

This review discusses vehicle tire technology advancements and their transformative effects on vehicle dynamics. Recent advances in material science, design, and manufacturing have transformed the tire industry. The introduction of "smart tires," which have sensors for continuous monitoring, is a major development. These tires analyze pressure, temperature, and tread depth to improve safety and fuel efficiency. Nanogenerators in tires demonstrate the automotive industry's move toward independence. Decision trees and analytical tools have been used to refine the process using retreading techniques, which are environmentally friendly and economically beneficial. The industry is focusing more on integrating intelligent tires with autonomous vehicles. Tire data combined with autonomous driving algorithms could set new safety and efficiency standards. Despite these advances, there is still room for innovation, particularly in commercializing energy harvesters for Tire Pressure Monitoring Systems (TPMS) and developing tire wear monitoring methods. Intelligent tires are increasingly important for vehicle performance and safety as autonomous vehicles become more common. This review discusses tire technologies' current state, future prospects, and future direction, positioning them as drivers of safer, more sustainable transportation.

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