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Mhd Razali, M.N., Zainal Abidin, A.N.S., Mohamad Yasin, M.R., Sufian, A.H., Nor Hamran, N.N.

The Potential of Nanomaterials for Improving Tire Rolling Resistance

(2024) *Springer Proceedings in Materials*, 40, pp. 497-507.

DOI: 10.1007/978-981-99-9848-7_45

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Funding details

Ministry of Higher Education, MalaysiaMOHE

Ministry of Higher Education, MalaysiaMOHE

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Publisher: Springer

ISSN: 26623161

Language of Original Document: English

Abbreviated Source Title: Springer. Proc. Mater.

2-s2.0-85189173944

Document Type: Book Chapter

Publication Stage: Final

Source: Scopus

Springer Proceedings in Materials

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Intelligent Manufacturing and Mechatronics

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

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ISSN 2662-3161

ISSN 2662-317X (electronic)

Springer Proceedings in Materials

ISBN 978-981-99-9847-0

ISBN 978-981-99-9848-7 (eBook)

<https://doi.org/10.1007/978-981-99-9848-7>

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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
Irfan Ahmed

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Conference paper | First Online: 18 March 2024

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Abstract

Tire design and manufacturing have undergone substantial transformations, with innovations spanning from the incorporation of nanomaterials to advanced spoke design techniques. Despite these advancements, critical gaps remain in our understanding of tire–pavement interactions, particularly under varied conditions and with different tire materials. Existing research offers crucial insights into traction influences, predominantly for off-road scenarios, but the dynamics of diverse pavement interactions warrant deeper exploration. Further challenges include achieving consistent nanomaterial dispersion within the tire’s rubber matrix and evaluating potential environmental and health impacts of these materials. Future research directions should prioritize a holistic approach that accounts for both tire and pavement characteristics, aiming to improve noise reduction, performance, and safety. Additionally, an eco-centric lens should guide the synthesis and application of nanomaterials in tire manufacturing, ensuring sustainability alongside innovation. Addressing these focal areas can pave the way for optimized, safe, and environmentally responsible tire solutions.

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Acknowledgements

The author extends sincere appreciation to the Ministry of Higher Education for their invaluable support of this study via the Fundamental Research Grant Scheme, with the grant reference RACER/1/2019/TK05/UMP//1. Their dedication to nurturing academic inquiry and progress was indispensable to this research. Further gratitude is directed to the Universiti Malaysia Pahang Al-Sultan Abdullah for their steadfast support and financial aid, as recognized by grant RDU Number RDU210312.

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