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V-MIEX

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VIRTUAL-MELAKA INTERNATIONAL INTELLECTUAL EXPOSITION

ROAD TO COMMERCIALISATION

V-MIEX BOOK



V - MIIEX BOOK

'ROAD TO COMMERCIALISATION'

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FOREWORD

ASSOC. PROF TS. DR MOHD RASDI ZAINI
Rector
Universiti Teknologi MARA (UiTM) Cawangan Melaka



Welcome to Virtual-Melaka International Intellectual Exposition 2022 (V-MIIEEX 2022). It is an honour for me on behalf of UiTM Melaka Branch to thank all of you for joining the programme and we are proud to inform you that this is the 12th year consecutively, UiTM Melaka Branch is organizing this exposition.

V-MIIEEX 2022 is a platform to improve the commercialization collaboration among industries and communities and at the same time, we also give the opportunity to academicians and students to share ideas and increase their potential innovation products with the industries and communities through their projects. This exposition also serves as a platform to cultivate and upload the nation's innovation culture by presenting new ideas and research by young people, especially from academia, universities, college, high schools, and primary school students.

The economy and development of the country faced a challenging phase in 2021 due to the Covid-19 pandemic. We faced changes in business, education, society, and lifestyle. However, the pandemic proved to be a blessing in disguise as it somehow gave people ideas which would be beneficial to improve their lifestyle and solve problems that might occur in the future. Besides, the new digital landscape also inspires more innovation and new ideas that contribute to various activities such as business and industries. As a university that encourages the "Research, Innovation and Commercialization", this exhibition is organized to encourage more commercialization of products that are beneficial to scholars, industries, and communities to tackle such issues to improve our present and future life.

Since 2009, UiTM Melaka Branch has successfully become the organizer for this innovation exposition. We are not only successful in organizing the exposition, but I would proudly say that we have also successfully embarked on commercialized products. With the number of participants for this year's exhibition, we believe that more commercialized products will be produced in line with the theme for this year, "Road to Commercialisation".

This exposition would never happen without dedication, teamwork, and commitment. A round of applause should be given to the committee teams as the backbone of this exposition. Their hard work, effort, and time made this exposition possible.

Finally, I would like to conclude this brief remark by thanking all the participants and stakeholders for joining the exposition, we hope that this collaboration never ends here.

Thank you.



DR. NUR HAYATI BINTI ABD RAHMAN
Deputy Rector Research & Industrial Linkages
Universiti Teknologi MARA (UiTM) Cawangan Melaka

It is a great pleasure to welcome all the participants and presenters to the Virtual Melaka International Intellectual Exposition (VMIIEX 22). I am delighted that through this periodic event, we managed to bring together scholars and professionals from various fields to engage through this virtual platform where ideas and breakthrough are discovered and leveraged for commercialization potential.

Since 2009 UiTM Cawangan Melaka has held twelve Invention and Innovation Design competitions and this year we are very honoured to have the second year of VMIIEX organized in digital platform. This has proven that despite the global challenges due to the recent pandemic, it is never an issue for UiTM Melaka to continuously organize this yearly prestigious event and to support the ministry's aspiration in leveraging creativity and innovation in the new norm.

VMIIEX 22 is organized with no sole objectives of accomplishing the University's KPI but instead we are determined to make this programme as the place to help heighten commercialization collaboration in research and innovation with the industry and community through joint exhibitions from various external organizations.

Our aspiration is to also provide exposure and opportunities to academic staff as well as students from public and private universities to engage in direct excellent scholarly activities with the industry and community through activities that can be measured and assessed. As for the Research and Industrial Linkages Office of UiTM Melaka, this exhibition is seen as the platform that can encourage active collaboration and knowledge transfer with industries; objectively to support various activities that will benefit all stakeholders from the various government agencies, local and international universities, industries and communities.

Through the theme of "Road to Commercialization" this year, V-MIIEX 22 is committed to have this event as a boulevard to inspire and cultivate creativity and innovation to the numerous levels of inventors through exposure on latest technologies, astonishing ideas and creative designs with great potential to be commercialized. For this year, we proudly introduce a special category which is the "Endemic Challenge" as the provision to the government of Malaysia's goal of moving towards the endemic.

To ensure that the competing products in this exhibition is not exclusively for the purpose of competition, V-MIIEX 22 is dedicated for the commercialization of highly potential innovation products, which is attained through its active collaboration with tailored needs industries. The commercialization effort was not for income generation purpose only but it aimed to spearhead the development of quality products in line with industrial needs and community benefit.

Therefore, it is a great honour for me on behalf of the Research and Industrial Linkages Office as well as the organizing committee to have all participants in this competition and I would like to express my highest gratitude especially to the Rector of UiTM Melaka and all strategic partners and sponsors for supporting the event.

To finish, I sincerely wish VMIIEX 22 a remarkable success. I believe that this will not be the only collaboration between UiTM Melaka and the respective partners and linkages, but a beginning of a long and fruitful cooperation in future.

Thank you very much.

road to commercialisation...

WAN HASMAT WAN HASAN
Project Director V-MIIEEX 2022
Universiti Teknologi MARA (UiTM) Cawangan Melaka



Assalamualaikum and Warmest Greetings.

It gives me an enormous pleasure, on behalf of the organizing committee to welcome all participants and presenters to the Virtual -Melaka International Intellectual Exposition 2022 (VMIIEX '22) with the theme "Road to Commercialisation". We are honoured and glad to welcome all participants to this biennial event.

This is the second time that we have organized this biennial event virtually. V-MIIEEX 22 is an innovation competition, in which, innovation products, ideas and systems related to various science and technological fields are exhibited as a solution for the presented problems.

V-MIIEEX22 expectantly will be a platform that gathers experts from academies, scientists, and researchers, locally and internationally, to contribute towards the growth of scientific and technological knowledge in each participant's specialisation and expertise.

The competition also serves as a platform to give fresh exposure to the various level of inventors, as well as to encourage the culture of innovation design focused on latest technologies and related to new norms technologies and inventions due to COVID-19.

V-MIIEEX 22 is also hoped to be an avenue for gathering and disseminating the latest knowledge on ideas and acquisition of innovation among the participants. It is hoped that the competition will be able to open the mind of the participants towards latest technologies and design. It is also in line with the government's aspiration to encourage innovation activities in Malaysia.

As a final note, I would like to congratulate my fellow committee members for their tremendous effort, which have been critical to the event's success. In addition, I would like to thank our co-organizer, event sponsors and supporters. Optimistically, we wish that all new knowledge that is discovered, invented, or innovated will drive towards our future sustainability.

Thank you.

ABOUT V-MIIEEX

The world after COVID-19 is unlikely to return to the world that was. Despite the challenging pace during the pandemic, the strong rebound is expecting in this exciting year 2022. Malaysia is welcoming the great prospects ahead with positive impact on the country's economy and development. Hence, the hope for greater opportunities motivates for more creative thinkers to come up with innovative ideas that can be put forward to be harnessed to overcome similar problems in the future. V-MIIEEx 2022 is one of these platforms which contribute relevant ideas that could help communities of all walks of life cope with this pandemic.

UiTM has identified research, innovation, and commercialization to be among the core components and strategic effort towards becoming a well-known and prominent university. Aside from realizing this goal, with these components and efforts, fostering the development of knowledge, generating financial stability of the university, and producing knowledgeable academicians are also potentially achievable.

By having invention and innovation competition yearly, UiTM Cawangan Melaka is confident that it could further enhance creative and innovative abilities among staff and students. In support of the government notion which upholds the importance of innovation, UiTM Cawangan Melaka has taken the initiative of organising the Virtual Melaka International Intellectual Exposition (V-MIIEEx).

In instigating and nurturing the continuous culture of inventing and innovating, this event is an ideal platform for lecturers, administrative staff, students, and the public to showcase and commercialize their products or prototypes as well as novel ideas. The first IID which was held nationally in UiTM Cawangan Melaka in 2009, has successfully gathered and displayed more than 37 inventions and innovations. Accordingly, to continue this strong passion towards inventing and innovating, the IID competition should be continued and celebrated.

With that, the Division of Research and Industrial Linkages will be organising its 12th IID competition, the Virtual - Melaka International Intellectual Exposition (V-MIIEEx 2022) with the theme, 'Road To Commercialisation'. V-MIIEEx 2022 hopes to welcome 200 competing products to be showcased and commercialized, at the same time, attract attention of related and matching industry.

Objectives

1. Encourage and instill passion towards inventing and innovating among UiTM Cawangan Melaka staff, students and academicians of local and international higher education institutions;
2. Highlight distinguished talents of skillful inventors and exhibit intellectual products, inventions and innovations among local and private tertiary institutions, government and private agencies, including international participants;
3. Become an effective Business Matching platform for participating research products, matching industries and partnering government agencies;
4. Recognise, inspire and promote invention and innovation products to be patented and commercialized;
5. Increase passion towards inventing and innovating through research and boost interests of government and non-government agencies to obtain consultancy services from a line up experts of higher education institutions and UiTM Cawangan Melaka.

paniMmagnetic Film

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Abstract

Polyaniline (PANi) are of interest conducting polymers due to its ease of synthesis at low cost using simple equipment together with its good conductivity. However, most conducting polymers exhibited poor stability, poor mechanical properties, low thermal conductance, and being amorphous which ultimately affects their performance. Thus, copolymerization of PANi with thermoplastic is one of the methods to retain conductivity of PANi but with extra added properties such as better processability and thermal stability. Therefore, this paper presents the results of the fabrication of a conducting film by copolymerization poly(methyl methacrylate) (PMMA) a thermoplastic polymer, with PANi. In this study, a series of doped PANi with different PANi ratios were copolymerized with PMMA by a free-radical copolymerization reaction to produce a conducting copolymer film. The results from characterization analysis of the film using fourier transform infrared (FTIR) spectrometer, nuclear magnetic resonance (NMR) spectroscopy, and ultraviolet-visible (UV-Vis) spectrometer are presented, which confirmed the chemical structure of both PANi and PMMA in the copolymer. Meanwhile, an evaluation using a resistivity meter found that the prepared copolymer films exhibited conductivity at around 10^{-7} to 10^{-6} S/cm, depending on the ratio of PANi incorporated with PMMA. Taking the conductivity properties into account, the electromagnetic interference (EMI) shielding effectiveness of the films has been carried out. In summary, the prepared conducting film can be further exploited to be used as an electronic magnetic shielding material in many electronic applications. The prepared conducting copolymer film for electromagnetic shielding material prepared in this study is known as paniMmagnetic film. The novelty of this research will be in the report of copolymerization PMMA with PANi using the free radical reaction method for electronic magnetic shielding applications.

Keywords: poly(methyl methacrylate), polyaniline, conducting film, EMI

1. INTRODUCTION

Conducting polymers are those polymers with conjugated double bonds along with their molecular structure. The conductivity is due to the overlapping p-orbitals that result in

delocalized π -electrons along the polymer chain. Among various types of conducting polymers, polyaniline (PANi) has gained much interest due to its ease of processing at a low cost. However, a few drawbacks of PANi include poor dispersibility in most organic solvents and limits its application as an electronic material especially in fabricating a thin uniform film. Thus, PANi is often used together with other materials such as thermoplastic either by physical blending or copolymerization to produce a new composite material with better uniformity and mechanical properties.

Poly(methyl methacrylate) or often abbreviated as PMMA is a thermoplastic material known for its good strength and optical characteristics. The other outstanding properties of PMMA include transparent, scratch resistance, and better resistance to weather and ultraviolet radiation. Benefiting from its better optical clarity, surface hardness, and scratch resistance, PMMA has been used extensively in the manufacturing of electronic devices. One of the most popular's in electronic devices and equipment is electromagnetic interference (EMI) shielding material. The main purpose of EMI shielding material in electronic devices is to prevent and block the electromagnetic signals from interfering with device's surrounding components. To date, the main commercialize materials for EMI shielding material is a sheet metal which is commonly made of copper, brass, nickel, silver, steel, and tin. Nevertheless, even though PMMA exhibited good optical characteristics, its non-conductivity limits its potential to be used as EMI shielding material.

As a solution, this study presented copolymerization of PMMA with another conducting polymer, PANi to produce a new conducting material that has synergic properties between good conductivity and high optical characteristics. The prepared conducting film is known as paniMmagnetic film.

2. OBJECTIVE

The aim of this research is to produce a new EMI shielding material with better EMI shielding properties but at lower production cost. paniMmagnetic film has been prepared using a simple copolymerization reaction, followed by a solvent casting technique to produce a conducting copolymer film.

3. NOVELTY & INVENTIVENESS

To date, it is still a challenge to design and fabricate a large-scale EMI shield material with good EMI shielding performance but at a relatively low production cost. In addition, the common material used as EMI shielding material are made of steel. The drawbacks of steel-based materials include heavyweight, high cost to fabricate on a large scale, prone to corrode, and lack of flexibility. On the other hand, since PMMA is a polymer, it is a lightweight material with better corrode resistance which makes a suitable candidate as a new EMI shielding material. PaniMmagnetic is expected to be commercially used in EMI shield application due to its cost-effectiveness, and ease to fabricate using simple equipment and processing, but with better EMI shielding performance.

4. PRACTICALITY & USEFULLNESS

In electronic devices such as mobile phone, EMI shielding essentially protect the phones by blocking the coming interferens from the environment and at the same time reducing the number of electromagnetic signals coming from the phone.

5. CONCLUSION

The new panimagnetic film is believed to open the door for next-generation cost-effectiveness EMI shielding material in many electronics applications.