

PROGRAMME & ABSTRACT BOOK

NANO SciTech 2017

27

INTERNATIONAL CONFERENCE ON NANOSCIENCE & NANOTECHNOLOGY 2017

DATE

Feb 24 - 27, 2017
(Friday to Monday)

VENUE

Institute of Business Excellence (IBE)
Universiti Teknologi MARA (UiTM)
Shah Alam, Selangor
MALAYSIA

ORGANISED BY

NANO-SciTech Centre
Institute of Science
Universiti Teknologi MARA (UiTM)
Shah Alam, Selangor
MALAYSIA

CO-ORGANISED BY

UiTM-NITech Liaison Office
Nagoya Institute of Technology (NITech)
Nagoya, JAPAN

Department of Electronic System Engineering
National Institute of Technology,
Kagawa College (NITKC)
Kagawa, JAPAN

Malaysia-Japan International
Institute of Technology (MJIT)
Universiti Teknologi Malaysia (UTM),
Kuala Lumpur, MALAYSIA

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Foreword by The Director of The Institute of Science



It is indeed a great pleasure for me to welcome all invited speakers and participants to the NANO-SciTech 2017 conference which are organized by the NANO-SciTech Centre, Institute of Science, UiTM, the Nagoya Institute of Technology (NITech), Japan, the National Institute of Technology, Kagawa College (NITKC), Japan and the Malaysia-Japan International Institute of Technology (MJIT), Universiti Teknologi Malaysia (UTM).

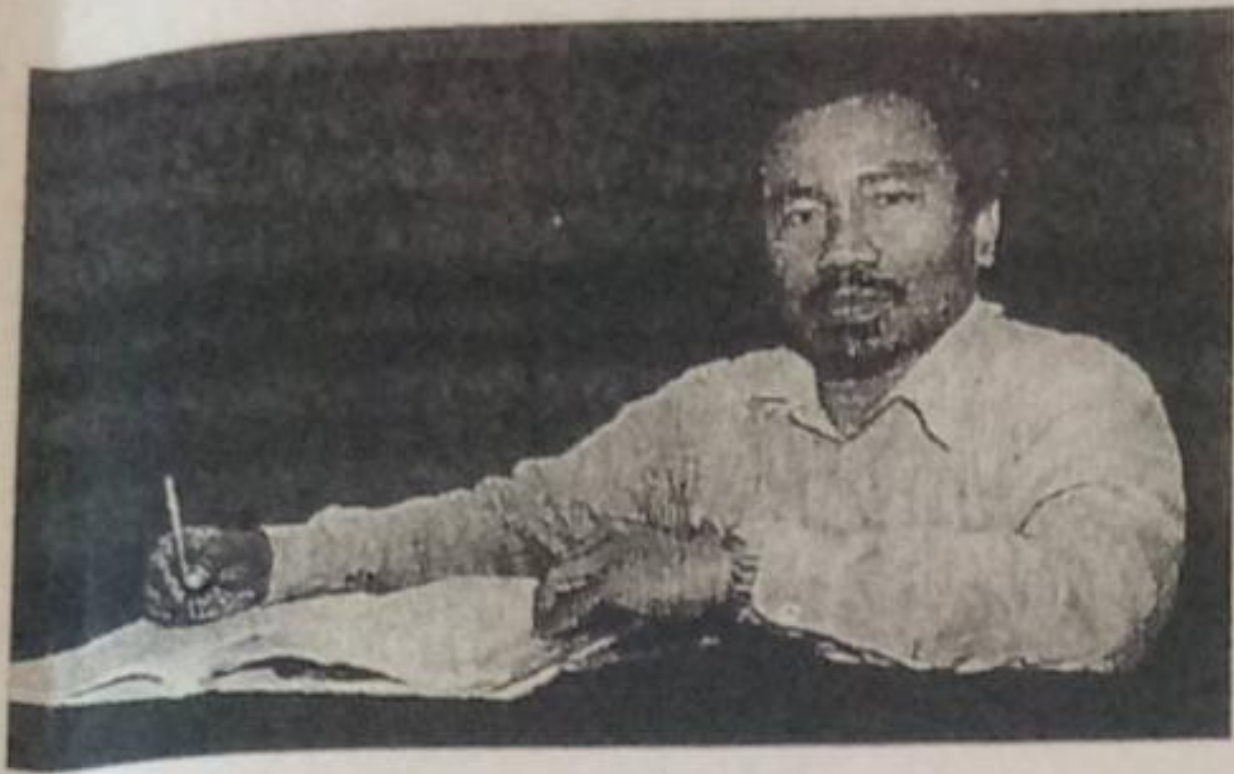
The NANO-SciTech Centre is one of the six research centres under the Institute of Science devoted to produce quality and cutting edge researches. I am very pleased with the commitment given by the NANO-SciTech Centre, Institute of Science, UiTM, the Nagoya Institute of Technology (NITech), Japan, the National Institute of Technology, Kagawa College (NITKC), Japan and the Malaysia-Japan International Institute of Technology (MJIT), Universiti Teknologi Malaysia (UTM) in organizing this event every two years without fail since the signing of the MoU between UiTM and NITech and NITKC. I hope this link will continue to contribute positively towards the Nanoscience and Nanotechnology research area.

In recent years we have seen a tremendous growth in Nanoscience, Nanotechnology and Nanoengineering research knowledge. This highly interdisciplinary field is expanding worldwide, leading to fundamental scientific advances and resulting in dramatic changes in the ways that materials, devices, and systems are understood and created. I am sure this conference will contribute to the growing knowledge in this field. I hope all of you will take this opportunity to share and exchange knowledge and research experience and form research collaborations.

I would like to take this opportunity to congratulate the organising committee on their tireless efforts, dedication and commitment in successfully organising the NANO-SciTech 2017. Last but not least I wish all of you a successful and rewarding conference.

Professor Dr Ahmad Sazali Hamzah
Institute of Science (IOS)
Universiti Teknologi MARA (UiTM)

Foreword by Chairman of the Organising Committee



On behalf of the organising committee, it is my great pleasure to extend a personal welcome to all participants to the 8th International Conference on Nanoscience and Nanotechnology 2017 (NANO-SciTech 2017). This international event which is hosted biennially, what more, as is the case

this year –running of NANO-SciTech 2017 and has been jointly organized by NANO-SciTech Centre, Institute of Science, UiTM, the Nagoya Institute of Technology (NITech), Japan, the National Institute of Technology, Kagawa College (NITKC), Japan and the Malaysia-Japan International Institute of Technology (MJIT), Universiti Teknologi Malaysia (UTM).

This conference will serve as an ideal platform for academicians, researchers and students to share their ideas and experiences in Nanoscience, Nanotechnology and Nanoengineering research. I am glad that experts in various fields of Nanoscience, Nanotechnology and Nanoengineering are here to present and discuss their work and the latest development in this field. I very much hope that this conference will synthesize new ideas and create new partnerships of multidisciplinary nature research at inter-institutional level.

I would like to express my gratitude to all staff, researchers and postgraduate students of the Institute of Science especially members of the organising committee for their willingness, commitment, dedication and relentless effort in ensuring that this conference is a success. I would also like to thank all sponsors for their support and generous contributions.

In closing, I wish all of you a pleasant and enjoyable conference over the next two days and to our foreign delegates, do take time to enjoy yourselves in Malaysia .

Mohamad Rusop Mahmood (Professor Engr Dr)
NANO-SciTech Centre (NST)
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NANO-SciTech 2017 Programme

FEBRUARY 24, 2017 (FRIDAY)		
15:00-18:00	PRE-REGISTRATION (IBE Lobby)	
FEBRUARY 25, 2017 (SATURDAY)		
07:30-09:00	REGISTRATION (IBE Lobby)	
Auditorium 1		
Chairperson: Dr Zuraida Khusaimi		
09:00-10:00	KEYNOTE LECTURE Devandran Krishnan NanoMalaysia Berhad	
10:00-10:30	INDUSTRIAL TALK 1 Perkin Elmer Sdn Bhd	
10:30-11:00	BREAK & POSTER SESSION	
PARALLEL SESSION		
Auditorium 1	Seminar Room	
Chairperson: Dr Zuraida Khusaimi	Chairperson: Dr Noor Asnida Asli	
11:00-11:40	INVITED LECTURE Saifollah Abdullah ✓ Universiti Teknologi MARA (UiTM)	INVITED LECTURE Azira Abd Aziz ? Lembaga Getah Malaysia (LGM)
11:40-12:00	O01	O03
12:00-12:20	O02	O04
12:20-13:00	INVITED LECTURE Nafarizal Nayan ✓ Universiti Tun Hussein Onn Malaysia (UTHM)	INVITED LECTURE Suriani Abu Bakar Universiti Pendidikan Sultan Idris (UPSI)

LUNCH & POSTER SESSION		
13:00-14:00	Auditorium 1	Seminar Room
	Chairperson: Dr Shafinaz Sobihana Shariffudin	Chairperson: Dr Ahmad Sabirin Zoolfakar
14:00-14:40	INVITED LECTURE Salina Muhammad Universiti Selangor (Unisel)	INVITED LECTURE Tetsuo Soga Nagoya Institute of Technology (NITech) ✓
14:40-15:00	O05	O11
15:00-15:20	O06	O12
15:20-15:40	O08	O13
15:40-16:00	O09	O14
16:00-16:20	O10	O16
16:20-17:00	INVITED LECTURE Mohd Azmuddin Abdullah Universiti Malaysia Terengganu (UMT)	INVITED LECTURE Yarub Al-Douri University of Sidi-Bel-Abbes ✓
17:00	BREAK & POSTER SESSION	

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07:30-09:00	REGISTRATION (IBE Lobby)
Auditorium 1 Chairperson: Dr Mohamad Hafiz Mamat	
08:30-09:00	WELCOME ADDRESS & OPENING CEREMONY
09:00-10:00	KEYNOTE LECTURE Prof. Dr Takeshi Yao National Institute of Technology, Kagawa College ✓
10:00-10:30	INDUSTRIAL TALK 2 <i>Retkia Amer</i> Gaia Science (M) Sdn Bhd ✓
10:30-11:00	BREAK & POSTER SESSION

PARALLEL SESSION		
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	Chairperson: Dr Mohamad Hafiz Mamat	Chairperson: Dr Mohd Kamil Yakkob
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12:00-12:20	O27	O29
12:20-13:00	INVITED LECTURE Mohd Arif Agam ✓ Universiti Tun Hussein Onn Malaysia (UTHM)	INVITED LECTURE ✓ Abdul Manaf Hashim Universiti Tehnologi Malaysia (UTM)
13:00-14:00	LUNCH & POSTER SESSION	
	Auditorium 1	Seminar Room
	Chairperson: Dr Mohd Husairi Fadzilah Suhaimi	Chairperson: Dr Puteri Sarah Mohamad Saad
14:00-14:40	INVITED LECTURE Shiro Nagaoka National Institute of Technology, Kagawa College ✓	INVITED LECTURE ✓ Nowshad Amin Universiti Kebangsaan Malaysia (UKM)
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16:40-17:00	O20	O24
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17:15	BREAK	

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08:00	Depart from UiTM Shah Alam
10:30	GUA TEMPURUNG TOUR, PERAK
13:30	LUNCH
14:30	Depart to Kellie's Castle
15:00	KELLIE'S CASTLE TOUR, PERAK
16:00	Depart to UiTM Shah Alam

ACKNOWLEDGMENT

1. Nagoya Institute of Technology, Japan (NITech)
2. National Institute of Technology, Kagawa College, Japan (NITKC)
3. Malaysia-Japan International Institute of Technology (MJIIT), Universiti Teknologi Malaysia (UTM)
4. NanoMalaysia Berhad
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10. Hi-Tech Instruments Sdn. Bhd.
11. Shimadzu (M) Sdn. Bhd.
12. Biotek Abadi Sdn. Bhd.

Invited Lecture

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Investigation of Electrical and Chemical Properties of Polystyrene Gold Nanocomposite

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Abstract - Gold nanoparticles (AuNPs) was synthesized by laser ablation method and incorporated into polystyrene nanosphere. Investigation of its electrical and chemical properties of these Polystyrene Metal Nano composites (PS-M) through Ultraviolet Visible spectroscopy (UV-Vis) and Attenuated total reflection Fourier Transform Infrared (ATR-FTIR) in determining its absorbance properties and chemical bonding effect in the PS molecules. Results of its electrical conductivity were interesting as at lower concentration of PVP showed the highest electrical conductivity.

1. INTRODUCTION

Polymers are form from identical units, bond to each other into long chains and slowly finding some role as electronic devices [1-3] especially as transistor, LED, detector and interconnect devices with the freedom of design, flexibility and low cost of plastics. Properly combining two materials, resulting in fabrication of composites that have the advantages of both organic polymers (e.g. flexibility, ductility, dielectric) and inorganic components (e.g. rigidity high thermal stability, strength, hardness, high refractive index), thereby generating considerable usages in wide areas [3], [4]. In this study PS-M metal composites are believe of having the various materials attributes of the polymer matrix [5-7] and offer unique optical and electrical properties [8] of in-organic materials. The smaller sizes of the metal-nanoparticles gave more surface area to involve either at physical or chemical interactions [9-11]. PVP is a nontoxic and hydrophilic synthetic polymer that it is found able to sustained pure elements [12-13] such as preventing particle aggregation and controlling the average particle size and even particle shape [14]. Laser ablation, is a technique in which a solid target usually placed under high power laser pulse for generating of nanoparticles such Ag in an aqueous solution of PVP [15-23].

2. METHODOLOGY

NPs were prepared by laser ablation gold were deposited on glass substrate, later immersed in a vessel filled with about 10 mL of PVP solution. The irradiation on the gold was conducted by the first harmonic (1064 nm) Nd:YAG laser, operated at 600 mJ/pulse with pulse duration of 10 ns and repetition rate of 6 Hz. FTIR analysis for investigation of molecules vibration, FESEM for imaging, Lucas Lab Pro4 system coupled to Keithley 617 electrometer and a ET-2500 multimeter for conductivity measurements.

3. RESULTS AND DISCUSSION

Figure 1. Reveal characteristic Plasmon resonance absorption peaks of the Au located at 520 nm, 525 nm for 0.025mM and 0.15 mM Au/PVP the peak absorbance increases with increasing concentration showing a linear dependence [24].

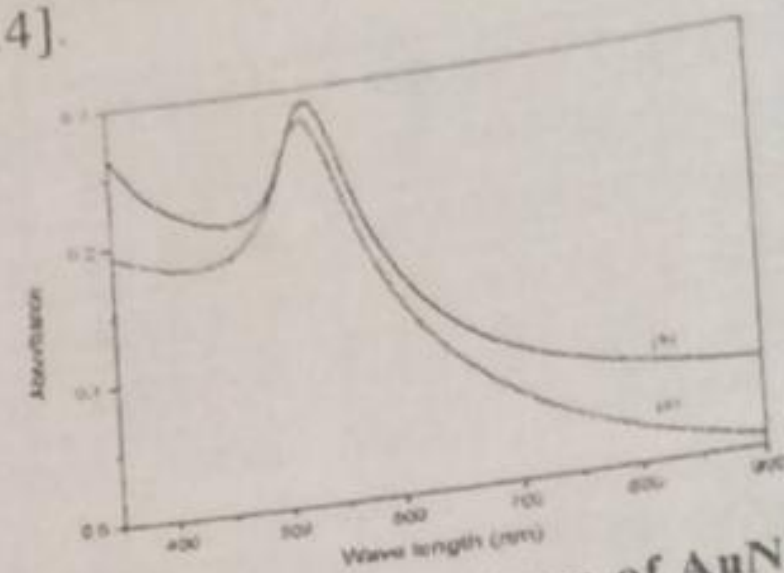


Figure 1: UV-Visible absorption spectrum of AuNPs produced in PVP solution of (a) 0.025mM (b) 0.15mM

3.1 Fourier Transform Infrared (ATR-FTIR)

ATR-FTIR study was carried out to understand possible interaction between gold nanoparticles and polymers. The ATR-FTIR spectra of PVP, PS, Au/PVP and PS:AuNPs are shown in figure 2-4. The IR characteristic absorption peaks of PS were observed at 2917.76cm^{-1} , 1600cm^{-1} and 1015.34cm^{-1} which are attributed to the vibration of C-H stretching, C=C stretching and C-H bending. The absorption band at 2913.54cm^{-1} for PS/Au has shifted slightly to 2950.85cm^{-1} in the case of Au/PVP indicating the presence of C-H stretching between gold and polystyrene molecules [23].

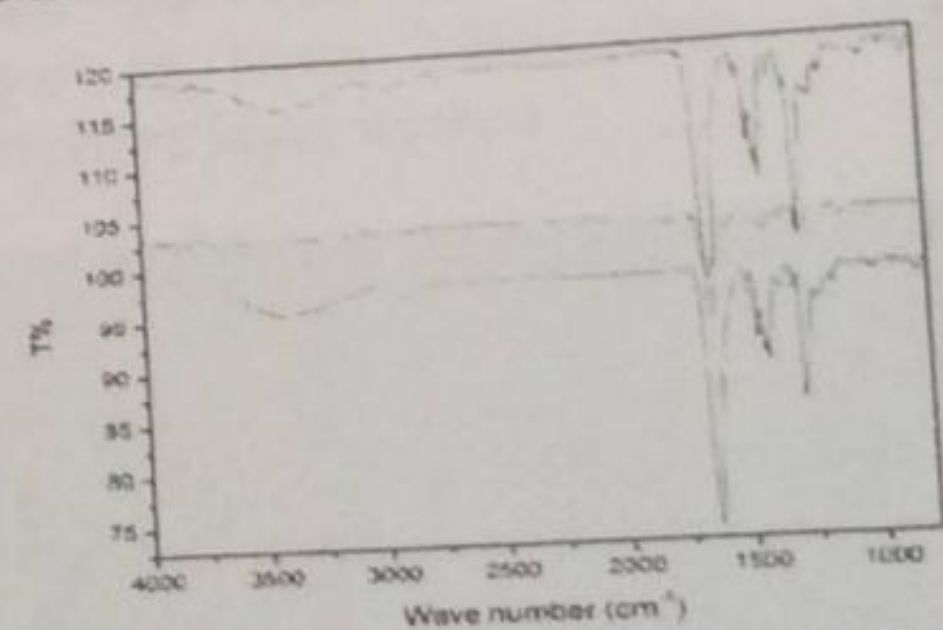


Figure 2: FTIR spectra of (a) pure PVP (b) Au/PVP 0.025 mM (c) Au/PVP 0.15 mM

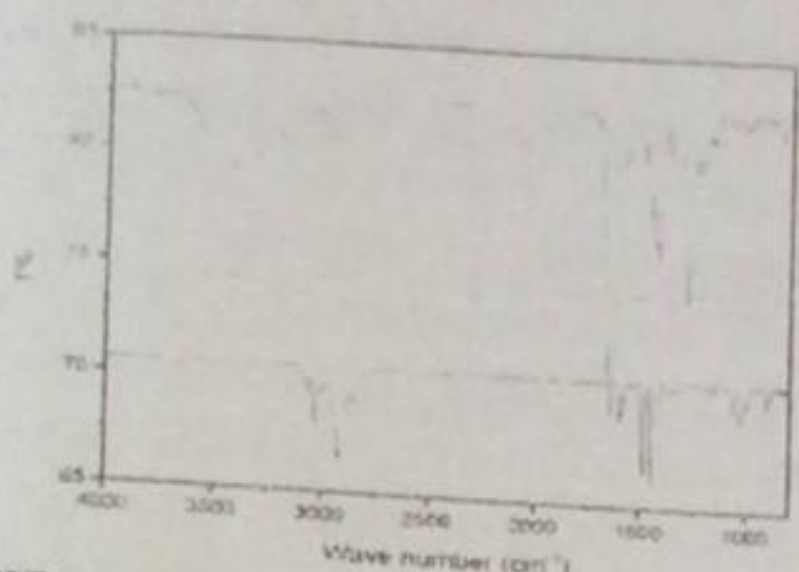


Figure 3: FTIR spectra of (a) pure PS (b) PS: AuNPs 0.025mM (1:4) (c) PS: AuNPs 0.15mM (1:4)

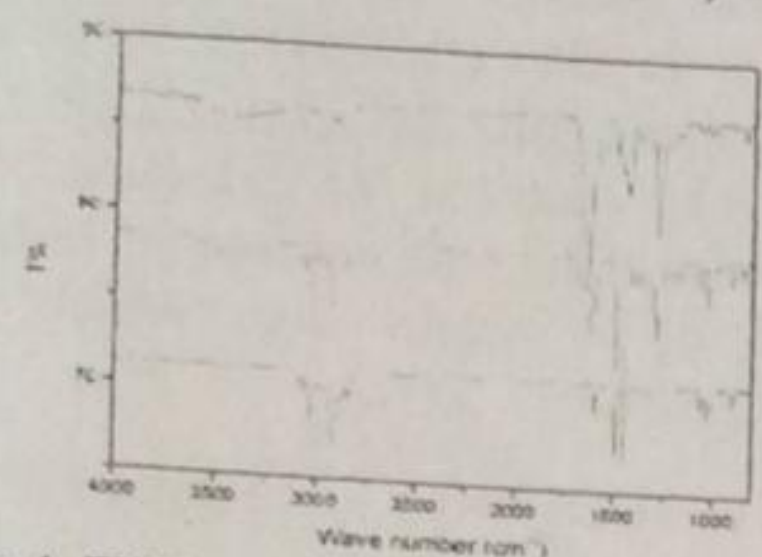


Figure 4: FTIR spectra of (a) pure PS (b) PS: AuNPs

3.2 Surface Profiler

Table 1: Concentration and thickness of samples

Concentration	Thickness (μm)
0.025mM Au/PVP	1.4186
0.150mM Au/PVP	1.7115
1:4 0.025mM PS/Au	0.7893
1:4 0.150mM PS/Au	1.0817
1:5 0.025mM PS/Au	0.7620
1:5 0.150mM PS/Au	0.6318

3.3 Four Point Probe

Table 2: Concentration and Resistivity

Concentration	Resistivity ($\Omega\text{-cm}$)
0.025mM Au/PVP	4.16×10^4
0.15mM Au/PVP	4.95×10^4
1:4 0.025mM PS/Au	5.53×10^2
1:4 0.150mM PS/Au	2.86×10^6
1:5 0.025mM PS/Au	9.47
1:5 0.150mM PS/Au	1.15×10^4

Table 3: Concentration and Conductivity

Concentration	Conductivity ($\Omega^{-1}\text{cm}^{-1}$)
0.025mM Au/PVP	2.40×10^{-5}
0.150mM Au/PVP	2.02×10^{-5}
1:4 0.025mM PS/Au	1.81×10^{-3}
1:4 0.150mM PS/Au	3.50×10^{-7}
1:5 0.025mM PS/Au	1.05×10^{-3}
1:5 0.150mM PS/Au	8.70×10^{-5}

4. CONCLUSIONS

The electrical and chemical properties of polystyrene were clearly affected by the presence of metal nanoparticles.

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6. REFERENCES

- [1] Y. Shim and P. National, "Conductive Polymers: Applications for Electronic Devices and Sensors," pp. 1–6, 2012.
- [2] K. Prabha and H. S. Jayanna, *Int. J. Eng. Res. Appl.*, vol. 5, no. 8, pp. 5–9, 2015.
- [3] V. S. Sangawar and M. C. Golchha, *Int. J. Sci. Eng. Res.*, vol. 4, no. 6, pp. 2700–2705, 2013.
- [4] A. Info, vol. 9, no. March, pp. 401–409, 2015.
- [5] G. V. Ramesh, S. Porel, and T. P. Radhakrishnan, *Chem. Soc. Rev.*, vol. 38, no. 9, pp. 2646–2656, 2009.
- [6] S. Porel, D. Ramakrishna, E. Hariprasad, A. Dutta Gupta, and T. P. Radhakrishnan, *Curr. Sci.*, vol. 101, no. 7, pp. 927–934, 2011.
- [7] O. M. Folarin, E. R. Sadiku, and A. Maity, *Int. J. Phys. Sci.*, vol. 6, no. 21, pp. 4869–4882, 2011.
- [8] K. Loeschner, G. Seifert, and A. Heilmann, *J. Appl. Phys.*, vol. 108, no. 7, 2010.
- [9] M. Gniadek, S. Malinowska, T. Rapecki, Z. Stojek, and M. Donten, *Synth. Met.*, vol. 187, no. 1, pp. 193–200, 2014.
- [10] V. K. Rao and T. P. Radhakrishnan, *J. Mater. Chem. A*, vol. 1, no. 43, p. 13612, 2013.
- [11] Y. Zare and I. Shabani, *Mater. Sci. Eng. C*, vol. 60, pp. 195–203, 2016.
- [12] R. Castell, C. Rojas, P. L. Ilustres, L. Chaguaramos, and V. De Sartenejas, vol. 62, no. June, pp. 188–192, 2016.
- [13] J. Zhang, J. Liu, S. Wang, P. Zhan, Z. Wang, and N. Ming, *Adv. Funct. Mater.*, vol. 14, no. 11, pp. 1089–1096, 2004.
- [14] A. Slistan-Grijalva, R. Herrera-Urbina, J. F. Rivas-Silva, M. Valos-Borja, F. F. Castilln-Barraza, and A. Posada-Amarillas, *Mater. Res. Bull.*, vol. 43, no. 1, pp. 90–96, 2008.
- [15] G. Kickelbick, vol. 28, no. August, 2015.
- [16] B. P. Tripathi and V. K. Shahi, *Prog. Polym. Sci.*, vol. 36, no. 7, pp. 945–979, 2011.
- [17] D. Zhang and B. Gokce, *Appl. Surf. Sci.*, vol. 392, no. October, pp. 991–1003, 2017.
- [18] V. Amendola and M. Meneghetti, *Phys. Chem. Chem. Phys.*, vol. 11, no. 20, pp. 3805–3821, 2009.
- [19] O. R. Musaev, J. Yan, V. Dusevich, J. M. Wrobel, and M. B. Kruger, *Appl. Phys. A Mater. Sci. Process.*, vol. 116, no. 2, pp. 735–739, 2014.
- [20] A. V. Kabashin, M. Meunier, C. Kingston, and J. H. T. Luong, *J. Phys. Chem. B*, vol. 107, no. 19, pp. 4527–4531, 2003.