



The 4th International Workshop on Advanced Materials and Devices

10-13 August, Thai Nguyen, Vietnam

PROGRAM AND ABSTRACTS

The 4th International Workshop on
Advanced Materials and Devices
IWAMD 2023

Program and Abstracts

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TABLE OF CONTENTS

TABLE OF CONTENTS	iii
ABOUT THE WORKSHOP	iv
General Information.....	iv
Publication.....	iv
Best Poster Award.....	iv
WORKSHOP ORGANIZATION.....	v
Organizers	v
Co-organizers	v
SPONSORS	vi
WORKSHOP COMMITTEE.....	vii
Chairmen	vii
International Advisory Committee	vii
Organizing Committee	vii
Program Committee.....	viii
Editors	viii
Secretariat	viii
INVITED SPEAKERS.....	ix
WORKSHOP VENUE.....	xi
WORKSHOP PLAN	xii
PROGRAM.....	1
Overall Program	3
Detailed Timelines for Parallel Sessions	7
Poster Presentations.....	25
ABSTRACTS	37
Note:.....	254
Note:.....	255
Note:.....	256

- 13:50 – 14:10 QMA-I5
Magnetic/gold nanocrescents like nano-heater and nano-probe
Xuan Hoa Vu, Thi Thu Ha Pham, Emmanuel Fort, Michael Levy, Tran Thu Trang, and Nguyen Van Dang
Thai Nguyen University of Sciences, Vietnam
- 14:10 – 14:30 QMA-I6 (online)
Optimization and manipulation of quantum dot based single photon source for quantum applications
Gia Long Ngo, Jean-Pierre Hermier, and Ngoc Diep Lai
LUMIN, ENS Paris-Saclay, Université Paris-Saclay, France
- 14:30 – 14:50 QMA-I7
Harnessing photonic bound states in the continuum for enhanced light-matter interactions in nanophotonics
Son Tung Ha, Mengfei Wu, Ramón Paniagua-Domínguez, Hai Son Nguyen, Cesare Soci, Hilmi Volkan Demir, and Arseniy I. Kuznetsov
Institute of Materials Research and Engineering, Agency for Science, Technology and Research, Singapore
- 14:50 – 15:10 QMA-I8 (online)
Novel mechanisms for light-matter interaction using bound states in the continuum
Hai Son Nguyen^{1,2}
¹Université de Lyon, Ecole Centrale de Lyon, CNRS, INSA Lyon, Université Claude Bernard Lyon 1, CPE Lyon, France; ²Institut Universitaire de France (IUF), France

BIN-2 Chairs: Trinh Chu Duc and Loi Tonthat

- 13:30 – 13:55 BIN-K2
From microengineering to organ-on-a-chip: An Evolution of Biochip Technology
Loc Do Quang¹, Hang Nguyen Thu², Tung Bui Thanh², and Trinh Chu Duc²
¹ University of Science, Vietnam National University, Hanoi, Vietnam; ² University of Engineering and Technology, Vietnam National University, Hanoi, Vietnam
- 13:55 – 14:15 BIN-I3
Multifunctional ultrasmall Au-Fe₃O₄ nanoparticles for cancer therapy
Loi Tonthat
Tohoku University, Japan
- 14:15 – 14:35 BIN-I4
3D-printing scaffolds with polycaprolactone/collagen/peptide enhance mouse mesenchymal stem vitality and bone regeneration
Van-Tinh Nguyen, Gun-Woo Oh, and Won-Kyo Jung
VINMEC High-Tech Center, Vietnam
- 14:35 – 14:55 BIN-I5
SERS detection of phenol on CuO/Au core/shell nanowires

Thi Ha Tran, Minh Phuong Le, Van Tan Tran, Quang Hoa Nguyen, Van Thanh Pham, Cong Doanh Sai, An Bang Ngac, Viet Tuyen Nguyen, and Nguyen Hai Pham

University of Science, Vietnam National University, Hanoi, Vietnam

14:55 – 15:10 BIN-O2

Utilizing response surface methodology for optimizing quercetin loaded niosome by ethanol injection method

Hien Minh Nguyen^{1,2}, Nguyen Thien Han Le^{1,2}, Tran Phuoc Tuan Nguyen^{1,2}, Binh Minh Do^{1,2}, Ngoc Trong Nghia Chau^{1,2}, Tan Thi Pham^{2,3}, and Minh Tri Le^{1,2}

¹School of Medicine, Vietnam National University Ho Chi Minh City, Vietnam;

²Vietnam National University Ho Chi Minh City (VNUHCM), Vietnam; ³Ho Chi Minh City University of Technology (HCMUT), Ho Chi Minh City, Vietnam

EMD-3 Chairs: Nguyen Quang Chinh and Susumu Horita

13:30 – 13:55 EMD-K3

Sustainable Graphene production, ink formulations and printing advanced chemoresistive sensing devices

Tran T. Tung, Kamrul Hassan, Anh Tuan Tran, Ramesh K, Ehab Mohamed A. E. Salih, and Dusan Losic

School of Chemical Engineering, The University of Adelaide, South Australia

13:55 – 14:15 EMD-I5

Ultrafine-grained metals: Their advantages in the use of micro-devices and description of grain size strengthening by a modified Hall-Petch equation

Nguyen Quang Chinh

Eötvös Loránd University, Budapest, Hungary

14:15 – 14:35 EMD-I6

Creating, reading, and deleting Skyrmions in a magnetic tunnel junction

Shaohai Chen

Institute of Materials Research & Engineering, Agency for Science, Technology & Research (A*STAR), Singapore

14:35 – 14:55 EMD-I7

Effect of ammonia gas in annealing process on reduction of residual OH-bonds and improvement of electrical properties of low-temperature silicon oxide films

Susumu Horita

Japan Advanced Institute of Science and Technology, Japan

14:55 – 15:10 EMD-O3

A first principles analysis on the effects of AGNR passivation towards adsorption of Hydrogen atoms

Kyle Alfred Paz, Al Rey Villagrancia, and Melanie David

De La Salle University, Philippines

EMD-4 Chairs: Peng Song and Shin-Ichiro Kuroki

13:30 – 13:50 EMD-I8

SiC CMOS integrated circuits and image sensors for extreme environment applications

Van Son¹, Dinh Khanh Manh¹, Nguyen Thi Yen Lan¹, Ngo Duy Minh¹,
Do Xuan Hai², Than Thi Trang Uyen³, Hoang Thi My Nhung¹, and
Nguyen Hoang Nam¹

¹VNU University of Science, Vietnam; ²Vietnam Military Medical University,
Vietnam; ³Vinmec Hightech Center, Vinmec, Vietnam

09:35 – 09:50 BIN-05

*A novel nanoemulsion in ethanol-water solution using Trisodium
citrate as emulsifying agent: formation and application in Si-QD/SiO₂
and NiFe₂O₄/SiO₂ core-shell structure synthesis*

Phi Thi Huong¹, Hoang V. Huy¹, Doan H. Anh², Nguyen H. Nam¹, Tran
T. Hong³, and Luu M. Quynh²

¹Nano and Energy Center, VNU University of Science, Hanoi, Vietnam; ²Faculty
of Physics, VNU University of Science, Hanoi, Vietnam; ³Faculty of
Environmental Sciences, VNU University of Science, Hanoi, Vietnam

09:50 – 10:05 BIN-06

*Understanding mechanism of photo-induced enhanced Raman
scattering on ZnO/Au nanorods*

Van Tan Tran, Minh Phuong Le, Quang Hoa Nguyen, Van Thanh Pham,
Cong Doanh Sai, Nguyen Hai Pham, Viet Tuyen Nguyen, Thi Ha Tran,
and An Bang Ngac

University of Science, Vietnam National University, Hanoi, Vietnam

10:05 – 10:20 BIN-07

*Investigation of the remineralization ability of biphasic calcium
phosphate in artificial saliva*

Nhi-Thao Ngoc Dang^{1,2} and Thi-Hiep Nguyen^{1,2}

¹International University, Vietnam; ²Vietnam National University, Ho Chi Minh
City, Vietnam

EMD-7 Chairs: Takehito Nakano and Ivan Škorvánek

08:30 – 08:50 EMD-I16

*Non-volatile multi-state switching of magnetisation states induced by
electric-field-driven in an micropatterned multiferroics*

Do Thi Huong Giang, Vu Nguyen Thuc, Ho Anh Tam, Nguyen Van Tuan,
Nguyen Thi Ngoc, Van-Hai Dinh, Le Van Lich, and Nguyen Huu Duc
VNU University of Engineering and Technology, Vietnam National University,
Hanoi, Vietnam

08:50 – 09:10 EMD-I17

Neutron diffraction studies on s- and p-electron magnets

Takehito Nakano

Ibaraki University, Japan

09:10 – 09:30 EMD-I18

*Ultra-rapidly annealed Ni-rich nanocrystalline Fe-Ni-Nb-B alloys with
excellent magnetic softness*

Ivan Škorvánek¹, Jozef Marcin¹, Branislav Kunca¹, and Peter Švec²

¹Institute of Experimental Physics, Slovak Academy of Sciences, Slovakia;

²Institute of Physics, Slovak Academy of Sciences, Slovakia

09:30 – 09:45 EMD-O9

*Exploration of transition metal oxides-based analog memristors with
self-rectifying characteristics for artificial synaptic applications*

Understanding mechanism of photo induced enhanced Raman scattering on ZnO/Au nanorods

Van Tan Tran, Minh Phuong Le, Quang Hoa Nguyen, Van Thanh Pham, Cong Doanh Sai, Nguyen Hai Pham, Viet Tuyen Nguyen, Thi Ha Tran, and An Bang Ngac*
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Surface-enhanced Raman spectroscopy (SERS) is a well-known technique for the detection of bio-substances. Among several assist techniques have been recently developed for additional augment of Raman signal, photo induced Raman enhancement (PIERS) has emerged as an effective approach. It has been demonstrated that the sensitivity of SERS could be improved by appropriate light excitation before or during Raman measurement. However, the underlying mechanism of PIERS is still under debate.

In this paper, sensitive SERS platforms based on ZnO/Au nanorods were prepared by hydrothermal and sputtering process. The study showed that an insitu UV excitation helped to enhance Raman signal efficiently. The enhancement process showed a reversible nature where a quick relaxation of Raman intensity to the initial level after shutting down UV excitation was observed. The mechanism of PIERS effect is attributed to the generation of electron – hole pairs and charge transfer of between ZnO and Au nanostructures.

Keywords: ZnO thin films, Au nanoparticles, sputtering, surface enhanced Raman scattering (SERS), Photo induced enhanced Raman scattering (PIERS), UV excitation

References:

- [1] J. Zhao, Z. Wang, J. Lan, I. Khan, X. Ye, J. Wan, Y. Fei, S. Huang, S. Li, J. Kang, Recent advances and perspectives in photo-induced enhanced Raman spectroscopy, *Nanoscale*. 13 (2021) 8707–8721. <https://doi.org/10.1039/D1NR01255J>.
- [2] V.T. Tran, T.H. Tran, M.P. Le, N.H. Pham, V.T. Nguyen, D.B. Do, X.T. Nguyen, B.N.Q. Trinh, T.T. Van Nguyen, V.T. Pham, M.Q. Luu, A.B. Ngac, Highly efficient photo-induced surface enhanced Raman spectroscopy from ZnO/Au nanorods, *Opt Mater (Amst)*. 134 (2022) 113069. <https://doi.org/10.1016/J.OPTMAT.2022.113069>.
- [3] S. Cong, X. Liu, Y. Jiang, W. Zhang, Z. Zhao, Surface Enhanced Raman Scattering Revealed by Interfacial Charge-Transfer Transitions, *The Innovation*. 1 (2020) 100051. <https://doi.org/10.1016/J.XINN.2020.100051>.