



THE 10TH INTERNATIONAL WORKSHOP
ON ADVANCED MATERIALS
SCIENCE AND NANOTECHNOLOGY

PROGRAMME & ABSTRACTS



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**THE 10TH INTERNATIONAL WORKSHOP ON
ADVANCED MATERIALS SCIENCE AND
NANOTECHNOLOGY**

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PROGRAMME & ABSTRACTS

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TOPICS OF THE WORKSHOP

1. Nanostructured Materials and Devices (code: NMD)
2. Materials for Electronics and Photonics (code: MEP)
3. Advanced Engineering Materials (code: AEM)
4. Advanced Materials and Nanotechnologies for Energy, Life Science, and Environment Technology (code: ELE)

	Vietnam
	AEM-P15: Synthesis of transition metal dichalcogenides for room temperature gas sensor application <u>Chu Manh Hung</u> International Training Institute for Materials Science, Hanoi University of Science and Technology, Hanoi, Vietnam
	AEM-P16: Microstructure and mechanical behavior of TiAlCrN coatings deposited by DC/RF magnetron sputtering technique <u>Vu Nguyen Hoang</u> ^{1,2} , <u>Nguyen Ngoc Linh</u> ¹ , <u>Dang Quoc Khanh</u> ² , <u>Doan Dinh Phuong</u> ¹ , and <u>Luong Van Duong</u> ¹ ¹ Institute of Materials Science, Vietnam Academy of Science and Technology, 18 Hoang Quoc Viet, Cau Giay, Hanoi, Vietnam ² School of Materials Science and Engineering, Hanoi University of Science and Technology, Hanoi, Vietnam
November 6th, 2021	
AEM-3 Chairmen: Le Thi Hong Lien and Vu Diem Ngoc Tran	
10:15-10:45	AEM-K03: Design and development of high entropy alloys for heat-resistant applications <u>Byungchul Kang</u> , <u>Taeyeong Kong</u> , <u>Ho Jin Ryu</u> , and <u>Soon Hyung Hong</u> Korea Advanced Institute of Science and Technology, Department of Materials Science and Engineering, Daejeon, Daejeon, Republic of Korea
10:45-11:10	AEM-I04: Comparison of structural, ferroelectric, and strain properties between donor and isovalent La doped BNKT ceramics <u>Vu Diem Ngoc Tran</u> ¹ and <u>Thi Hinh Dinh</u> ² ¹ School of Materials Science and Technology, Hanoi University of Science and Technology, Hanoi, Vietnam ² Faculty of Material Science and Engineering, Phenikaa University, Ha Dong, Hanoi 12116, Vietnam
11:10-11:25	AEM-O04: Fabrication of Ag@graphene composite via green synthesis using plant extracts and its application for conductive ink <u>Tam The Le</u> ¹ , <u>Huy Hoang Tran Bui</u> ² , <u>An Khang Phung Dinh</u> ³ , <u>Sang Nguyen Canh</u> ⁴ , <u>Quang Dinh Ho</u> ¹ , <u>Hoai An Nguyen Thi</u> ² , and <u>Duong Duc La</u> ⁵ ¹ Vinh University, Vietnam ² Ha Huy Tap High School, 8 Phan Boi Chau, Nghe An, Vietnam ³ Phan Boi Chau Specialized High School, 119 Le Hong Phong, Nghe An, Vietnam ⁴ Hanoi University of Science and Technology, Hanoi, Vietnam ⁵ Institute of Chemistry and Materials, Academy of Military Science and Technology, Vietnam
11:25-11:40	AEM-O05: Gas-phase 3D printing of functional materials <u>Viet Huong Nguyen</u> ¹ , <u>Abderrahime Sekkat</u> ² , <u>Kevin P. Musselman</u> ³ , and <u>David Munoz Rojas</u> ²

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AEM-O04

FABRICATION OF Ag@GRAPHENE COMPOSITE VIA GREEN SYNTHESIS USING PLANT EXTRACTS AND ITS APPLICATION FOR CONDUCTIVE INK

Tam The Le¹, Huy Hoang Tran Bui², An Khang Phung Dinh³, Sang Nguyen Canh⁴, Quang Dinh Ho¹, Hoai An Nguyen Thi², and Duong Duc La⁵

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²Ha Huy Tap High School, 8 Phan Boi Chau, Nghe An, Vietnam

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⁵Institute of Chemistry and Materials, Academy of Military Science and Technology, Vietnam

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ABSTRACT

Green synthesis has been extensively considered in the past few years as an environmentally friendly and affordable method for the synthesis of nanomaterials. Many extracts from the plants have been successfully used as green reductants for this purpose. In this study, Ag nanoparticles were reduced and decorated on the surface of the graphene nanoplatelets using the Cleistocalyx operculatus leaves extract as a reductant. The obtained Ag/graphene nanocomposites were characterized by scanning electron microscopy (SEM), energy dispersive spectroscopy mapping (EDX mapping), X-ray diffraction (XRD), energy dispersive X-ray spectroscopy (EDX), and Fourier transform infrared spectroscopy (FTIR). The results showed that Ag nanoparticles (AgNPs) with diameters ranging from 20 - 40 nm were uniformly distributed on the graphene nanoplatelets' surface. The resultant Ag@graphene composite was employed as the main component in the conductive ink's composition, showing a high conductivity of higher than 103 S/m.

AEM-O05

GAS-PHASE 3D PRINTING OF FUNCTIONAL MATERIALS

Viet Huong Nguyen¹, Abderrahime Sekkat², Kevin P. Musselman³, and David Munoz Rojas²

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ABSTRACT

Nanoscale films of functional materials are integral to all modern electronics, and energy applications. So far, several vacuum-based mature technologies have been developed to fabricate such thin films. However, with the fast development of flexible and low-cost devices, it is highly

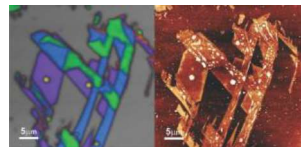
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AFM - Raman
XploRA Nano

Key applications:

- 1D, 2D materials (Graphene, MoS2...)
- Polymers, organic molecules
- Stress in semiconductors
- ...



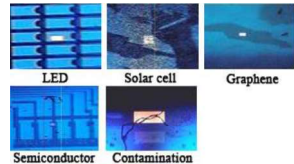
Raman-AFM co-localization image of graphene



Ellipseometry
UVISEL Plus

Key applications:

- Thickness, optical constant
- Material/surface modification
- Roughness, porosity
- Gradient layer, interface
- Transmission, relectivity curve
- ...



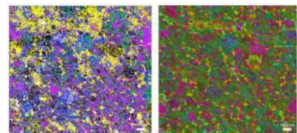
Real-time colour image of the sample and exact measurement spot



X-Ray Analytical Microscope
XGT-9000

Key applications:

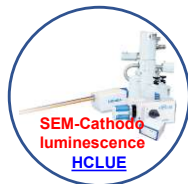
- Non-destructive failure analysis on electronic components
- QC, counterfeit products, presence of foreign materials
- Particle analysis of film and battery
- Fast thickness measurement of thin metal coatings
- QC of semiconductors which feature thin and narrow patterns
- ...



Maps of meteorite. (Left) Chemical Raman map. (Right) Elemental X-ray Fluorescence map



Fluorometer
Nanolog



SEM-Cathode luminescence
HCLUE



GD-OES
GD-Profilier 2



PEM Fuel Cell Testing Equipment

- PEM single fuel cell and component testing
- Fuel cell stack testing
- PEM Fuel cell system testing
- Balance-of-Plant
- Fuel cell production line



Fuel Cell Test Equipment for SOFC

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- Fuel cell stack and hot-box system testing
- SOFC Fuel cell system testing
- Production line for SOFC fuel cells



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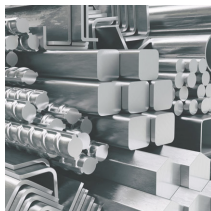
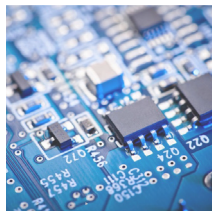
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- Máy phân tích ứng suất dư tia X,...



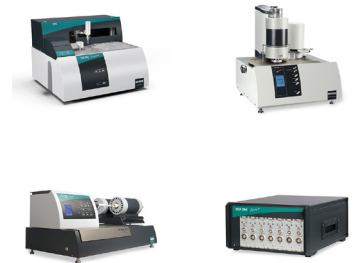
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