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Letter to Editor

Enthusiastic discussions on solid-state physics and materials science at SPMS2021

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ABSTRACT

The 12th National Conference on Solid State Physics and Materials Science (SPMS2021) gathered various notable scientists (7 plenary speakers and 34 invited speakers). Attending the conference and actively participating in the debate were more than 450 scholars with an interest in the topic. Four hundred reports were divided into five specialized sessions, including (A) physics and magnetic materials, (B) semiconductor and dielectric physics, (C) semiconductor and dielectric materials and devices, (D) biomedical materials and materials for agriculture, energy, and the environment, and (E) composite materials - metals, ceramics, and Vietnam-Korea sessions on applied physics. In addition, the Organizing Committee received numerous full-text reports that had been submitted to the Journal of Science and Technology (Vietnam Academy of Science and Technology) following a rigorous review procedure.

SPMS2021 co-organized by the Vietnam Physical Society, the Vietnam Materials Research Society (V-MRS), the Institute of Physics, the Institute of Materials Science (Vietnam Academy of Science and Technology), Hanoi University of Science and Technology, Vietnam National University (VNU), Phenikaa University, and Can Tho University was held on 13 – 15 August 2022 in Can Tho City after nearly 9 months of postponement due to the COVID-19 pandemic. The conference has attracted 7 plenary speakers, 34 invited speakers, and over 450 scientists (Figure 1, Table 1, and Table 2)[1]. It is not only a sizable and esteemed scientific conference that draws the interest of the Vietnamese scientific community, but it is also a venue for getting together, exchanging ideas, and disseminating the most recent advancements in the SPMS sector. Since 1995, it has been conducted continuously every two years. Many scientists are generally interested in the domains of solid-state physics and materials science, which have a wide range of activities and exceptional accomplishments in both basics and applications in Vietnam.

Key words: solid-state physics, materials science, SPMS, national conference

The conference attracted the participation of more than 450 researchers from universities and research institutes nationwide along with a number of foreign scientists. Noticeably, there were 120 reports at plenary sessions and 5 specialized sessions, associated with 350 posters. Five specialized sessions include (A) physics and magnetic materials, (B) semiconductor and dielectric physics, (C) semiconductor and dielectric materials and devices, (D) biomedical materials and materials for agriculture, energy and environment, and (E) composite materials - metals – ceramics. In particular, to strengthen the traditional international cooperation relationship with Korean scientists, SPMS 2021 organized a Vietnam-Korea session on Materials physics. In addition, a large difference between this year's conference compared to previous conferences is the participation of a number of business leaders who are also scientists bringing research in materials science to industrial production.

Unlike previous conferences[2], the highlight of SPMS2021 is the participation of invited speakers in technology transfer. Prof. Pham Thanh Huy (Phenikaa University) introduced the latest trends in lighting technology for human health and some of his group's recent research results on human-centric lighting technology, including phosphor synthesis, design, and manufacturing of LED chips and LED lamps and the successful transfer of the products into commercial production (Figure 2a). Dr. Nguyen Thanh My (Founder and Board of Director Chairman, Mylan Group) shared his experiences from research to commercialization of new materials for media, 3D, and traceability printing industries (Figure 2b).

Research on energy conversion and storage has become a hot topic and has attracted great attention. For example, Prof. Wieslaw Strek presented laser-induced hydrogen generation from solution by using graphene foam (Figure 3a). Dr. Tran Ngoc Huan presented

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selective ethylene production from CO_2 and CO reduction by engineering gas diffusion electrodes using Cu-based electrocatalysts (Figure 3b). To generate clean water by exploiting solar energy, MSc. Dang Thi Hai Linh evaluated the ability to harvest fresh water from carbon materials fabricated from sludge in domestic wastewater treatment plans. Similar to this concept, Dr. Nguyen Van Than reported paper-based carbon nanodot composites for solar-driven clean water generation (Figure 3c). In terms of energy storage, this topic has received much attention. For example, Dr. Huynh Le Thanh investigated the phase transition of V_2O_5 materials in rechargeable Na-ion batteries by Raman scattering spectroscopy. Dr. Nguyen Van Nghia investigated the electrochemical properties of p2-type layered structural materials applied in energy storage devices. Dr. Ngoc Hung Vu synthesized a layered-spinel structure of Li_3MnTiO_{4+z} ($0.8Li_2Mn_{0.5}Ti_{0.5}O_3 \bullet\ 0.2LiMnTiO_4$) as a working electrode for Li-ion batteries. The detailed invited speakers and interesting talks are presented in Table 2. In particular, SPMS2021 organized a Vietnam-Korea session on Materials physics (Figure 4) with 12 invited speakers (Table 2). The session has created a bridge for scientific exchange between Vietnam and Korea as well as long-term cooperation between the two countries.

The oral presentations occurred consistently throughout the two days of 14-15 August 2022. In addition, participants could make networks through the cozy coffee breaks and the ebullient-discussing poster parts (Figure 5a) and visited Tra Vinh University (Figure 5b) and the Mylan group (Figure 5c). During the conference, the Executive Committee of V-MRS also held a meeting (Figure 5c). Thanks to the wonderful international attendees and the host who meticulously planned and prepared for the conference, SPMS2021 was a successful and worthwhile event. Thanks are especially due to the conference day chairmen: Prof. Nguyen Duc Chien, Prof. Tran Ngoc Hai, Prof. Nguyen Xuan Phuc, Prof. Le Quoc Minh, Prof. Pham Thanh Huy, and sections' chairs.

The conference hopes that everyone who attended had a positive experience and was inspired by the numerous noteworthy suggestions from SPMS2021. In 2023, SPMS2023 will take place. With the knowledge gained from the SPMS's extensive history, a more noticeable meeting will be held the next year, especially containing a special segment for scholars from many other countries. We anticipate that many scientists with a keen interest in solid-state physics and materials science and their applications will find SPMS2023 to be a truly exceptional opportunity. We look forward to seeing you at SPMS 2023.

Figure 1: Photograph of invited speakers and participants at the 12th Vietnam National Conference on Solid State Physics and Materials Science 2021 (SPMS 2021).

Figure 2: (a) Prof. Pham Thanh Huy and (b) Dr. Nguyen Thanh My giving talks at the conference (the photos were taken at the conference)

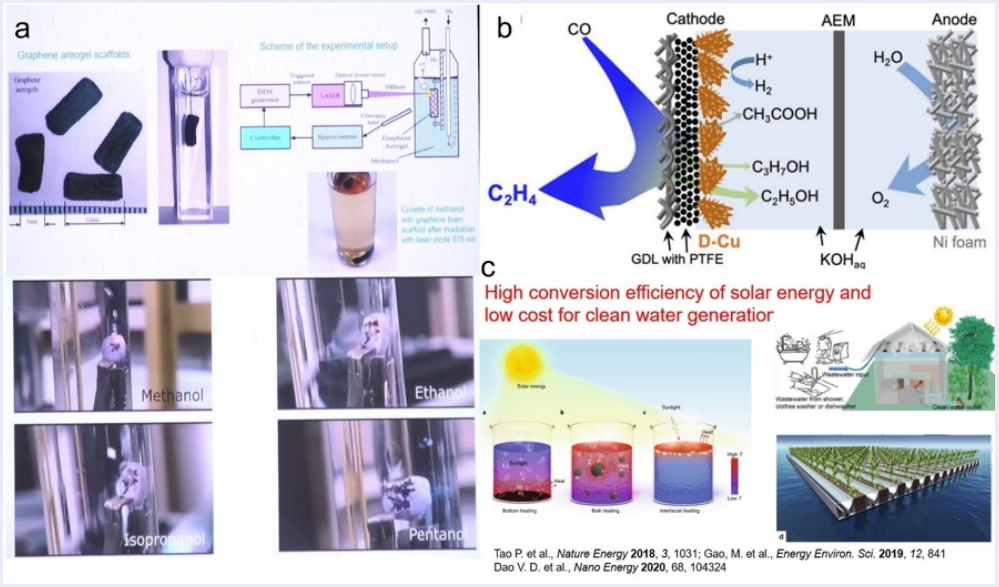

Figure 3: (a) H_2 generation from solution (methanol, ethanol, isopropanol, pentanol) with graphene aerogel as the target, (b) Activity of CO electroreduction, (c) Localization of solar-thermal energy to air/liquid interface (The photos were taken at the conference)

Figure 4: Vietnam-Korea session on Materials physics

Figure 5: Photo of (a) poster section, (b) Tra Vinh University, (c) Mylan group, and (d) V-MRS Executive Committee meeting

Table 1: Plenary talks for SPMS2021

Presentor	Title
Wiesław Stręk (Polish Academy of Sciences, Poland)	Laser induced hydrogen generation from solution by using graphene foam
Prof. Pham Thanh Huy (Phenikaa University, Vietnam)	Trends in natural lighting and human-centric lighting
Prof. Young Uk Jeong (Korea Atomic Energy Research Institute, Korea)	Ultrafast electron beam, a tool to explore the nanoscopic world of materials
Prof. Nguyen Quang Liem (Vietnam Academy of Science and Technology, Vietnam)	Chương trình khoa học và công nghệ cấp quốc gia giai đoạn đến 2030: "Nghiên cứu và phát triển công nghệ vật liệu" KC.02/21-30 (National Science and Technology Research Programs for the period to 2030: "Research and development of materials technology" KC.02/21-30)
Prof. Maeng-Je Seong (Chung-Ang University, Korea)	Room temperature valley polarization of the B-excitons in monolayer MoS2
Dr. Nguyen Thanh My (Founder and Board of director chairman, Mylan Group, Tra Vinh, Vietnam)	New materials from research to commercialization - Experience from an Entrepreneur
Prof. Tran Vinh Hung (Polish Academy of Sciences, Poland)	Mossbauer effect spectroscopy investigation in the institute of low temperature and structure research, polish academy of science

Table 2: Invited talks for SPMS2021

Presentor	Title	Specialized subcommittees
Prof. Do Thi Hương Giang	Hệ thống thiết bị đo và định vị từ trường trái đất dựa trên hiệu ứng từ giáo-áp điện và kỹ thuật GPS (System of measuring and positioning the earth's magnetic field based on the piezoelectric magnetic effect and GPS technology)	Physics and magnetic materials
Prof. Nguyen Phuc Duong	Trật tự nguyên tử, từ độ và từ điện trở của hệ hợp kim Heusler CoMnSb0.9Z0.1 (Z=Al, Bi, Si, Sn) (Atomic order, magnetometer, and magnetic resistance of Heusler alloy system CoMnSb0.9Z0.1 (Z=Al, Bi, Si, Sn))	
Prof. Soonil Lee	Defect chemistry in dielectrics and thermoelectrics	
Prof. Nguyen Hoang Nam	Mối quan hệ giữa lực kháng từ và pha trật tự từ L10 trong hạt nano từ FePt (Relationship between coercive force and ordered phase from L10 in FePt magnetic nanoparticles)	
Prof. Nguyen Huy Dan	Nghiên cứu hợp kim nhớ hình nền Ni-Mn (Research on alloy for wallpaper memory Ni-Mn)	
Prof. Nguyen Ngoc Hieu	Tính chất điện tử và truyền dẫn của một số vật liệu hai chiều (Electronic and transmission properties of some two-dimensional materials)	Semiconductor and dielectric physics
Prof. Luc Huy Hoang	Phép đo In situ Raman trong nghiên cứu quá trình điện hóa khử CO_2: triển vọng và thách thức (In situ Raman measurement in CO_2 reduction electrochemical process: prospects and challenges)	
Prof. Nguyen Thanh Tien	Structural and electronic properties of (n,n) pentagonal $PdSe_2$ nanotubes: A first-principles calculations	
Prof. Nguyen Tran Thuat	Mô phỏng tương tác mạch giữ kích thích từ trong vật liệu peroskite cơ kim halogen hai chiều và quang tử trong cấu trúc tuần hoàn một chiều (Simulation of the magnetic excitation-holding circuit interaction in two-dimensional halogen-metallic perovskite and photonics in a one-dimensional cyclic structure)	
Prof. Le Van Lich	Hiệu ứng áp điện thuận của vật liệu sắt từ điện barium strontium titanate có thành phần thay đổi (The forward piezoelectric effect of barium strontium titanate ferromagnetic materials with variable composition)	
Prof. Chan Cuk Hwang	Controlling the electronic structures of two-dimensional materials for new functionalities	Materials - semiconductor components - dielectric
Dr. Nguyen Viet Huong	Gas-phase 3D printing of functional thin films	
Prof. Stefan Lis	Nanoluminophores doped with lanthanide ions and their multifunctional nanostructures excellent optical sensors and anticounterfeiting materials	

Continued on next page

Table 2 continued

Prof. Vo Quang Mai	Khảo sát quy trình chế tạo màng nano ZnO không mầm bằng phương pháp thủy nhiệt và khả năng quang xúc tác dị thể (Investigation of the fabrication process of seedless ZnO nanofilms by hydrothermal method and heterogeneous photocatalysis)	
Prof. Nguyen Van Duy	Nghiên cứu chế tạo đa cảm biến cho ứng dụng nhận dạng và phân tích khí (Research and manufacture of multisensors for gas identification and analysis applications)	
Dr. Huynh Le Thanh Nguyen	Nghiên cứu các quá trình chuyển pha của vật liệu V_2O_5 trong pin sạc Na-ion bằng phương pháp phổ tán xạ raman (Studying the phase transitions of V_2O_5 materials in rechargeable Na-ion batteries by Raman scattering spectroscopy)	Biomedical materials - agriculture, energy - environment
Dr. Tran Ngoc Huan	Selective ethylene production from CO_2 and CO reduction by engineering gas diffusion electrode using Cu-based electrocatalysts	
Prof. Nguyen Quang Liem	Nanoporous silica: fabrication from rice husks and possible applications	
Dr. Tran Thi Nhu Hoa	Phát hiện lượng vết xanh methylen bằng tán xạ Raman tăng cường bề mặt dựa trên vật liệu nano bạc kết hợp graphene oxit khử (Detecting trace amounts of methylene blue by surface-enhanced Raman scattering based on silver nanomaterials incorporating reduced graphene oxide)	
Prof. Nguyen Thai Hoang	Chế tạo composite AC/CNTS ứng dụng trong xử lý kim loại nặng bằng công nghệ điện dung (Fabrication of AC/CNTS composites applied in heavy metal treatment by capacitive technology)	
Prof. Vo Thanh Tung	Properties of lead-free BZT-BCT ceramics synthesized using CuO as a sintering aid	Composite materials - metals – ceramics
Dr. Le Manh Tu	Electron nucleation of Ni-Co alloy from Ni-MH spent batteries using a deep eutectic solvent based on choline chloride	
Prof. Sunglae Cho	2D-crystals & superlattices: Growth & some properties	Vietnam-Korea session on applied physic
Prof. Phan Bach Thang	Effect of structural distortions on thermoelectric properties of materials	
Prof. Kyuwook Ihm	Single crystal and thin film growth	
Prof. Sanghoon Kim	Helical magnetism and spin transport of the Fe_5-$xGeTe_2$ crystal	
Prof. Jungdae Kim	Scanning tunneling microscopy (STM) study on layered chalcogenide materials	
Prof. Nguyen Van Hieu	A comparative study on gas-sensing properties of external and internal heterojunctions based on hybrid nanofibers	

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Table 2 continued

Prof. Sungdae Ji	Neutron scattering techniques and their applications
Dr. Vu Ngoc Hai	Vehicle integrated concentrator photovoltaics based on compound parabolic concentrator
Prof. Fabian Rotermund	Graphen-based IR-to-THz broadband nonlinear photonics
Prof. Le Anh Tuan	Design of hybrid 2D nanomaterials-based sensing platform for amplifying electrochemical redox signals of antibiotic and veterinary drug residues in food samples: A smart rapid alter solution for food safety
Prof. Yeong Kwan Kim	Mapping the berry curvature distribution with photoemission spectroscopy
Prof. Kitae Lee	Investigation of ultrafast structural dynamics with KAERI mega-electron-volt ultrafast electron diffraction facility

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