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Programme and Abstracts

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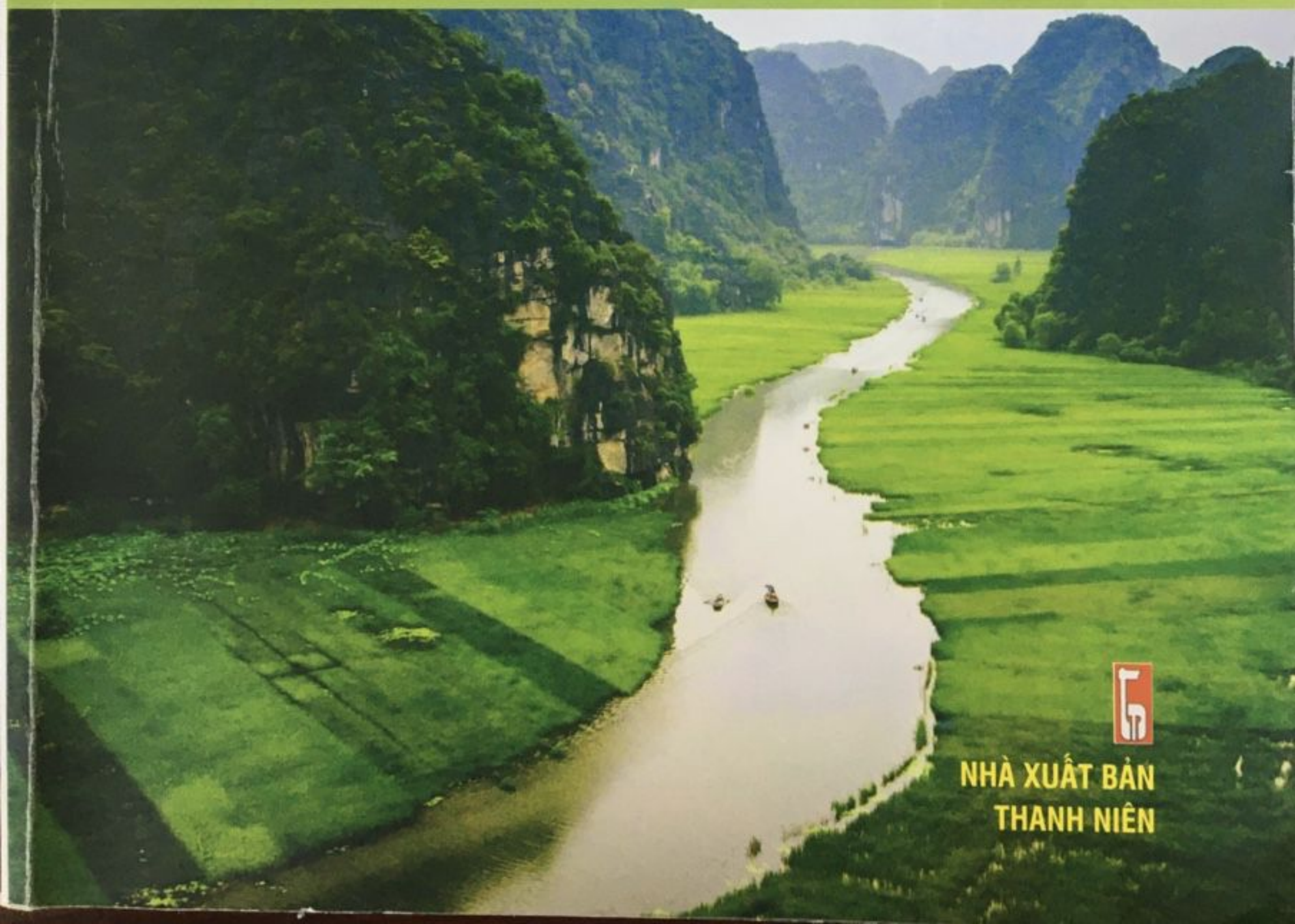

NHÀ XUẤT BẢN
THANH NIÊN

	NLE-P22: Simulation study of new structure of MEMs-based strain gauge sensor toward bridge health monitoring system in Vietnam *Trinh Xuan Thang, Nguyen Chi Cuong, Truong Van Phat, Maxime Projetti, and Ngo Vo Ke Thanh* Research Laboratories of Saigon High-Tech-Park, Lot I3, N2 street, Saigon High-Tech-Park, District 9, Ho Chi Minh city, Vietnam
November 9th, 2018	
NLE-3 Chairmen: Ye Enyi and Nguyen Thi Quynh Hoa Venue: Room R5 Time: 08:30-10:00	
08:30-08:55	**NLE-I04: Anisotropic nanocrystals and their biomedical and environmental applications** *Ye Enyi* Institute of Materials Research and Engineering (IMRE), Agency for Science, Technology and Research (A*STAR)
08:55-09:20	**NLE-I05: Redox polymer-based nanotherapeutics for oxidative stress-related diseases** *Long Binh Vong[1] and Yukio Nagasaki[2]* [1]University of Science Ho Chi Minh, Vietnam [2]University of Tsukuba, Japan
09:20-09:45	**NLE-I06: Solvothermal synthesis and photocatalytic activity of Ni-doped FeS_2 nanoparticles** *Lam Trung Hieu,[1] Nguyen Hoa Du,[1] Phan Thi Hong Tuyet,[1] Nguyen Hong Quang,[1] Duong Ngoc Huyen,[2] Nguyen Thi Quynh Hoa[1]* [1]Vinh University, Vietnam [2]Institute of Physics Engineering, Hanoi University of Science and Technology, Vietnam
09:45-10:00	**NLE-O05: New nano-structured oligochitosan-silica hybrid material: synthesis and investigation on the antifungal ability** *Thuy N Nguyen, Thu M T Huynh, Quy D Hoang, Hien Q Nguyen* Faculty of Materials Science and Technology, University of Science, VNU-HCM, Vietnam
	Break
NLE-4 Chairmen: M. Rei Vilar and Long Binh Vong Venue: Room R5 Time: 10:30-11:55	
10:30-10:55	**NLE-I07: Cotton fibres functionalized with nanoparticles to promote the destruction of harmful molecules** *Soraa Bouattour[1], A. M. Ferraria[2], L. F. Vieira Ferreira[2], A. M. Botelho do Rego[2], S. Boufi[3], Mohamed Chehimi[4], M. Rei Vilar[4]* [1]University of Sfax, Faculty of Science, LCI, BP1171-3018 Sfax, Tunisia [2]CQFM-Centro de Química-Física Molecular and IN-Institute for Nanosciences and Nanotechnologies and IBB-Institute for Bioengineering and Biosciences, Instituto

NLE-I06

SOLVOTHERMAL SYNTHESIS AND PHOTOCATALYTIC ACTIVITY OF Ni-DOPED FeS_2 NANOPARTICLES

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ABSTRACT

FeS_2 nanoparticles has many has attracted extensive interest for various applications such as the electrodes of solar cells, the elimination of pollutants, and the splitting of water for hydrogen fuel due to their exellent optical, electrical and photocatalytic properties [1-3]. Up to now, transition metal dichlcogenide nanomaterials have been synthesized by various methods such as hot injection, hydrothermal, microwave irradiation methods. In this study, we report some results of Ni-doped FeS_2 nanoparticles synthesized using facile solvothermal method and their visible-light photocatalytic characteristics.

Undoped FeS_2 and transition metal doped FeS_2 nanoparticles were synthesizied via solvothermal method. In a typical reaction, 7.5 mL of oleylamine was added into a 50 mL teflon-lined stainless steel autoclave containing 0.25 mmol of iron (II) acetylacetonate, 0.25 mmol of hexadecandiol, 1.5 mmol of sulfur powder and and a required amount of nickel chloral hydrate. By varying amount of nickel chloral hydrate, the Ni doping concentrations were controlled to be 5 at.% to 20 at.%. The reaction mixture was sonicated for an hour to ensure homogenous mixing before the autoclave was sealed and maintained at 190°C for 20 h. The autoclave was then cooled to room temperature naturally and the precipitate collected via centrifugation. The morphology, microstructure and optical properties of the nanoparticles were investigated by scanning electron microscope (SEM), X-ray diffractometer (XRD), transmission electron microscopy (TEM), Raman and absoprtion spectra. The photocatalytic activities of the nanoparticles were evaluated by the decomposition of methylene blue under both UV and visible light irradiation. The high-quality of the nanoparticles were formed with different size of ~50 nm -70 nm. XRD, HRTEM and Raman studies revealed that the nanoparticles had a highly crystalline with cubic pyrite structure. Both the undoped and Ni-doped nanoparticles showed visible light photocatalysis. We will further discuss the growth mechanism and photocatalytic characteristics of the undoped and Ni-doped FeS_2 nanoparticles.

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Keywords: FeS_2 nanoparticles, pyrite, photocatalytic activity, visible light photocatysis.

References:

[1] W. L. Liu, X. H. Rui, H. T. Tan, C. Xu, Q. Y. Yan and H. H. Hng, RSC Adv. 4, 48770-48776 (2014).

[2] M.V. Morales-Gallardo, A.M. Ayala, Mou Pal, M.A. Cortes Jacome, J.A. Toledo Antonio, N.R. Mathews, Chem. Phys. Lett. 660, 93-98, (2016).

NLE-I07

COTTON FIBRES FUNCTIONALIZED WITH NANOPARTICLES TO PROMOTE THE DESTRUCTION OF HARMFUL MOLECULES

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ABSTRACT

Self-decontaminating cotton fabrics were designed, elaborated and characterized aiming the decomposition of harmful molecules namely chemical warfare agents (CWA) by photocatalysis under day light or indoor illumination. This was achieved through the creation of a hybrid organic-inorganic nanostructured system composed of a thin layer of TiO_2 nanoparticles (NPs) generated in-situ chemically immobilised on the cellulose chains of the textile fibres. TiO_2 NPs were converted into anatase by a hydrothermal procedure at low temperature around 100°C. The tissues covered with TiO_2 nanoparticles were studied in terms of their chemical composition, morphology, cristalinity, aging, robustness and the photocatalytical properties. One of the important achievements in this work was providing fabrics with suitable photocatalytic activity under visible light. This was reached through plasmonic photocatalysis by generating noble metal nanoparticles (Au, Ag) and/or their halogenides (AgBr, AgCl) neighbouring or topping the TiO_2 NPs in the fabrics. The kinetics of degradation of the different systems were analysed and proved that the resulting fabrics could efficiently decompose organic dyes, under visible light and dimethyl methylphosphonate (DMMP), a CWA simulant. In the whole preparation of the photocatalytic fabrics, only environment-friendly solvents (water or alcohol) were used.