

BULGARIAN ACADEMY OF SCIENCES  
GEORGI NADJAKOV INSTITUTE OF SOLID STATE PHYSICS  
NCMCT Workshop on Advanced Materials & Technologies  
Meridian Hotel Bolyarski, Veliko Tarnovo  
February 28<sup>th</sup> – March 1<sup>st</sup>, 2023

## PROGRAM

### February 27<sup>th</sup> (Monday)

17:00 – 18:00 Registration  
18:00 – 20:00 Cocktail

### February 28<sup>th</sup> (Tuesday)

09:30 – 09:40 Opening Ceremony

**09:40 – 11:00 Chair: H. Chamati**

09:40 – 10:20 N. Drenchev, K. Chakarova, M. Mihaylov, E. Ivanova, L. Dimitrov, H. Aleksandrov, G. Vayssilov and K. Hadjiivanov, Adsorption of CO<sub>2</sub> on cation-exchanged FAU zeolites

10:20 – 11:00 E. Guziewicz, Atomic layer deposition as a growth method for advanced materials

**11:00 – 11:20 Coffee break / Collective photo**

**11:20 – 12:20 Chair: A. Dinescu**

11:20 – 11:40 K. Maksimova -Dimitrova, G. Borisov, E. Lefterova and E. Slavcheva, Composite catalysts on interactive oxide support for alkaline water electrolysis

11:40 – 12:00 I. Bineva, D. Nesheva, B. Valdez-Salas, M. U. Grujić-Brojčin and M. J. Šćepanović, Morphology control and enhanced sensitivity of thin film semiconductor oxides-based gas sensors: a fractal analysis study

12:00 – 12:20 V. Dzhurkov, D. Spasov, A. Paskaleva and D. Nesheva, Gas sensor test equipment Kenosistec KGAS4S. How does it work and areas of application?

**12:20 – 14:00 Lunch break**

**14:00 – 16:00 Chair: M. Šćepanović**

14:00 – 14:40 I. M. Szilágyi, Marcell Bohus, Z. I. Varady and T. Leba, Hybrid and composite oxide and carbon nanofluids

14:40 – 15:20 V. Donchev and M. Milanova, Dilute nitrides heterostructures grown by liquid phase epitaxy for solar cells applications

15:20 – 15:40 D. Nesheva, R. Gegova-Dzhurkova, I. Stambolova, K. Zaharieva, and V. Dzhurkov, Improving the photocatalytic and sensing properties of sol-gel ZnO thin films by modifying the way of preparation

15:40 – 16:00 S. Boyadjiev, B. Blagoev, D. Delibatov, V. Mehandzhiev, P. Terziyska, I. Avramova and P. Rafailov, Characterization of graphene and ALD grown Al<sub>2</sub>O<sub>3</sub>/graphene heterostructure

16:00 – 18:00 Poster Session

**March 1st** (Wednesday)

**09:30 – 10:50** **Chair: D. Nesheva**

09:30 – 10:10 M. Šćepanović and M. Grujić-Brojčin, Effects of laser power and excitation wavelength on the Raman spectra of nanostructured materials

10:10 – 10:50 A. Dinescu, M. Dragoman, A. Muller, A. Baracu and A. Avram, field emission scanning electron microscopy for nanoscale fabrication

**10:50 – 11:10** **Coffee break**

**11:10 – 12:30** **Chair: E. Guzewicz**

11:10 – 11:30 M. Shehadi, S. Karatodorov, L. Stoychev, D. Tsankov and T. Petrov, Measurement of nonlinear optical characteristics of wide bandgap semiconductor AlN using modified femtosecond z-scan method

11:30 – 11:50 P. M. Rafailov, C. Thomsen, M. M. Gospodinov, P. K. Sveshtarov, V. B. Mehandzhiev and D. Z. Dimitrov, Raman characterization of low-dimensional nanostructures and single crystals

11:50 – 12:10 E. Iordanova, G. Yankov, H. Chamati and L. Kovachev, Compression of neutral particles by an optical lens

12:10 – 12:30 G. Borisov, N. Borisov, J. Heiss, U. Schnakenberg and E. Slavcheva, Thin Pt films as catalysts for electrochemical hydrogen compression

**12:30 – 14:00** **Lunch break**

**14:00 – 15:20** **Chair: I. M. Szilágyi**

14:00 – 14:40 A. Paskaleva and D. Spassov, Challenges to optimize charge trapping non-volatile flash memories cells with HfO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> stacks

14:40 – 15:20 S. Banerjee, Towards an expanded palette of materials and mechanisms for neuromorphic computing

**15:20 – 15:30** **Closing Ceremony**

## POSTER PRESENTATIONS

1. A. Stoyanova, B. Karamanova and S. Veleva, The impact of physicochemical characteristics of carbon materials on the capacitive performance of symmetric supercapacitors with alkaline electrolyte.
2. B. Abrashev, V. Terziev, M. Pandev, D. Levi, M. Slavova and K. Petrov, Novel structure of composite gas-diffusion electrode (CGDE), containing zeolite for rechargeable metal hydride (MH)-air batteries.
3. G. Yankov, N. Stankova and E. Iordanova, The effects of ultrafast laser pulses on the properties of advanced medical-grade PDMS polymer.
4. V. Mankov, G. Dyankov, E. Hikova and H. Kisov, SPR sensors biochips based on protected silver/copper layers.
5. P. Karakashkova, V. Serga, G. Tyiliev and S. Minkovska, Synthesis and characterization of TiO<sub>2</sub>/WO<sub>3</sub> nanocomposites with enhanced photocatalytic activity.
6. O. Kostadinova, K. Banov and S. Stankov, Raman spectroscopic evidence for multiphase composition in copper tin sulfides.
7. P. Vassileva, I. Uzunov and D. Voykova, Kinetics, equilibrium and thermodynamics of Congo red removal by cationized materials based on agricultural waste.
8. G. B. Hadjichristov and S. Minkovska, Optical spectroscopy of photochromic fluorescent spirooxazines sensitive to metal ions.
9. B. Mladenova, G. Borisov and E. Slavcheva, Highly efficient catalyst applicable in electrochemical hydrogen pump/compressor.
10. S. Stankov, O. Kostadinova, I. Popov, H. Kolev and T. Petkova, Physicochemical and electrocatalytic properties of non-stoichiometric Ba<sub>2</sub>Sr<sub>2</sub>La<sub>2</sub>Ti<sub>4</sub>O<sub>12</sub> perovskites.
11. S. Veleva, B. Karamanova, A. Stoyanova and A. Arenillas, Electrochemical properties of carbon xerogel-based supercapacitors using non-aqueous electrolytes.
12. G. B. Hadjichristov, Y. G. Marinov and T. E. Vlakhov, Nematic liquid crystals/polymer composites as ion conductors.
13. V. Terziev, B. Abrashev and K. Petrov, Electrochemical investigation of carbon based gas diffusion electrodes (GDEs) for rechargeable metal hydride (MH)-air battery.
14. B. Karamanova, A. Stoyanova and A. Aliosmanova, Effect of the conductive additives on the capacitive performance of symmetric supercapacitors based on activated carbon in alkaline electrolyte.
15. E. Petkucheva, G. Borisov, B. Mladenova, H. Penchev, F. Ublekov and E. Slavcheva, Materials, structure, function and possibilities of AEM-URFCs.
16. V. Nikolov, I. Koseva, P. Ivanov, M. Gancheva, P. Tzvetkov, P. Petrova and R. Tomova, Europium doped germanate glass-ceramics containing Ca<sub>5</sub>Ge<sub>3</sub>O<sub>11</sub> as a main phase for potential red phosphor application.
17. I. Dionisieva, P. Rafailov, B. Babeva, K. Buchkov, V. Videva, V. Strijkova, Hr. Dikov, V. Marinova and D. Dimitrov, Structural characterizations of 2D tungsten diselenide.
18. I. Tsacheva, O. Dimitrov, M. Dimitrova, A. Gigova and D. Uzun, Microwave-assisted synthesis of phosphorus containing composites as functional electrocatalytic materials.
19. N. Bozhanova, V. Zhelev, O. Kostadinova, M. Dimitrova, O. Dimitrov, V. Ilcheva, V. Boev and T. Petkova, Structural characterization of Ce<sub>1-x</sub>Sm<sub>x</sub>O<sub>2-x/2</sub> powders prepared by ionic gelation and high temperature techniques.
20. N. Minev, P. Rafailov, V. Videva, V. Strijkova, I. Avramova, I. Dionisieva, K. Buchkov, Hr. Dikov, D. Dimitrov and V. Marinova, Low temperature synthesis of PtSe<sub>2</sub> and PtTe<sub>2</sub> nanolayers.

21. B. Drenchev, V. Boev, L. Sosserov, V. Ilcheva, M. Dimitrova, O. Dimitrov and A. Stoyanova, Transformation of powder-pasted and electroplated zinc active mass after cycling in Ni-Zn battery cells.
22. V. Zhelev, O. Kostadinova, S. Stankov, K. Banov, P. Petkov and T. Petkova, Investigation of the physicochemical and electrochemical behaviour of heat-treated shungite.