

Eleventh National Conference on Chemistry

*Chemistry Education for Public Understanding of
Science*

49th National Chemistry Teachers Conference

*University of Chemical Technology and
Metallurgy*

23-24 June 2022, Sofia, Bulgaria

Programme



Honorary committee

N. Denkov, K. Hadjiivanov, I. G. Ivanov, I. Juchnovski, Ch. Tsvetanov

Scientific committee

Chair: D. L. Tsalev

Members: Ch. Balarew, V. Bankova, M. Bogdanov, E. Boiadjieva, M. Bojinov, V. Bojinov, V. Dimitrov, N. Dishovski, G. Kadinov, D. Kashchiev, M. Kirova, S. Nenkova, L. Petrov, I. Pojarlieff, I. Rashkov, E. Slavcheva, T. Spassov, S. Stoilov, R. Stoyanova, A. Tafrova-Grigorova, S. Terzieva-Zhelyazkova, B. Toshev, I. Valchev, E. Vassileva, E. Zhecheva

Organizing committee

Chair: V. Beschkov

Scientific secretaries: Ch. Bonev, I. Havezov

Secretaries: A. Kamusheva, V. Neychev

Member: V. Pandzherova

Conference organizer

Company for International Meetings Ltd.

Symposia titles and chairs

- | | |
|--|-----------------------------------|
| 1. Physical chemistry and electrochemistry | M. Bojinov |
| 2. Organic chemistry and pharmacy | V. Dimitrov |
| 3. Inorganic chemistry and technology | R. Stoyanova, E. Zhecheva |
| 4. Analytical chemistry | D. Tsalev |
| 5. Catalysis | G. Kadinov |
| 6. Chemical engineering and environmental protection | V. Beschkov |
| 7. Biobased and synthetic polymers and bioproducts | N. Dishovski, S. Nenkova |
| 8. Chemistry education | A. Tafrova-Grigorova
M. Kirova |

Schedule

Thursday, 23rd June 2022

- 08.30–18.00 Registration and information
- 10.00–18.00
- Asen Zlatarov Hall**
- 10:00–10:15 Opening ceremony: V. Beschkov
- 10:15–11:00 L1-Invited lecture: T. Spassov
- 11:00–11:45
- 11:00–11:30 **Coffee break**
- 11:30–12:15 L2-Invited lecture: I. Karadjova
- 11:45–12:30
- 12:15–12:30 Company presentation: K. Doktorov
- 12:30–12:45 Awarding ceremony: B. Velikov
- 12:45–13:00 Awarding ceremony: S. Stefanov
- 13:00–14:00 **Lunch**
- Hall 431**
- 14:00–15:45 Oral session: Symposia 1, 2, 7
- Hall 439**
- 14:00–16:00 Junior and high school student session: Symposium 8
- 16:00–16:30 **Coffee break**
- 16:30–17:45 Oral session: Symposium 8
- 16:30–18:00 Poster session: All symposia
- 18:00–18:10
- 18.00–20.00 **Welcome reception at university campus**

Friday, 24th June 2022

- Registration and information
- Asen Zlatarov Hall**
- L3-Invited lecture: A. Tafrova-Grigorova
- L4-Invited lecture: V. Beschkov
- Lunch**
- Hall 431**
- Oral session: Symposia 3, 4, 6
- Hall 439**
- Oral session: Symposium 8
- Coffee break**
- Discussion: A. Tafrova-Grigorova, E. Boiadjieva
- Closing ceremony: V. Beschkov

Programme

Thursday, 23rd June 2022

08.30–18.00 **Registration and information**

Asen Zlatarov Hall

- 10:00–10:15 **Opening ceremony** V. Beschkov
- 10:15–11:00 **L1-Invited lecture:** T. Spasov, L. Mihaylov,
Metallic glasses: suitable precursors for
Ev. Vassileva
porous structures by dealloying
- 11:00–11:30 **Coffee break**
- 11:30–12:15 **L2-Invited lecture:** I. Dakova, P. Vassileva,
Smart materials for speciation analysis I. Karadjova, T. Yordanova,
E. Mladenova
- 12:15–12:30 **Company presentation:** K. Doktorov
Innovative teaching and learning tools and
programs for teachers and educators from
T.E.A.M. and Agilent
- 12:30–12:45 **Awarding ceremony:** B. Velikov
National competition for the best diploma
thesis'2022 sponsored by AQUACHIM Co
- 12:45–13:00 **Awarding ceremony:** S. Stefanov
National competition for the best chemistry
teacher'2022 sponsored by St. St. Cyril and
Methodius International Foundation

13:00–14:00 **Lunch**

Hall 431

14:00–15:45 **Oral session**

- 14:00–14:15 **1-O1:** Electrochemical process for K. Kolev, B. Yanachkov, L. Lutov,
production of pure iron strip for
L. Drenchev
mechanical tests
- 14:15–14:30 **2-O1:** Use of ($[^{18}\text{F}]$ FDG) as a prosthetic G. Simeonova, B. Todorov,
group for indirect radiofluorination V. Lyubomirova
- 14:30–14:45 **2-O2:** Bis(dichlorotriazine)-substituted P. M. Miladinova
reactive dyes containing stabilizer
fragment as a decision to solve ecological
problems
- 14:45–15:00 **7-O1:** Enabling bioprinting of 3D tissue H. Saradzkhova, Y. Sbirkov,
models: the polymer chemistry of 3D D. Molander, S. Todinova,
extrusion bioprinting V. Sarafian, M. Redzheb

- 15:00–15:15 **7-O2:** Properties of eco-friendly fibreboard panels fabricated with different adhesive systems based on hydrolysis lignin V. Savov, I. Yordanov, I. Valchev
- 15:15–15:30 **7-O3:** Novel hybrid materials based on polycarboxybetaine methacrylate and calcium phosphates K. Ruseva, M. Simeonov, E. Djulgerova, P. Shestakova, E. Vassileva
- 15:30–15:45 **7-O4:** Two-layer polyzwitterionic hydrogels capable of changing their shape in a controlled manner N. Petrov, K. Ruseva, E. Vassileva

16:00–16:30 **Coffee break**

Hall 439

14:00–16:00 **Junior and high school student session**

14:00–14:30 **Orally presented posters**

- 14:00–14:15 Significant achievements in chemistry S. Hammashi, 10th grade, Uvekind Private High School, Sofia
- 14:15–14:30 Occasional discoveries in chemistry M. Stankov, V. Tsvetkov, 10th grade, Prof. E. Ivanov High School of Natural Sciences and Mathematics, Kyustendil
- 14:30–14:45 **Essay:** Significant achievements in chemistry D. Hristev, 11th grade, Acad. Kiril Popov High School of Mathematics, Plovdiv
- 14:45–16:00 **Oral presentations**
- 14:45–15:00 Occasional discoveries in chemistry I. Milev, 5th grade, Dimcho Debelyanov 134 School, Sofia
- 15:00–15:15 Occasional discoveries in chemistry M. Georgieva, 11th grade, Holy Septuagint First Secondary School, Targovishte
- 15:15–15:30 Occasional discoveries in chemistry I. Ivanov, M. Hristova, 11th grade, Mathematics High School, Lovech
- 15:30–15:45 Outlook and challenges for chemistry of the future P. Yordanova, N. Velichkova, 9th grade, Ivan Vazov Secondary School for Foreign Languages and Management
- 15:45–16:00 Occasional discoveries in chemistry V. Toev, 10th grade, Prof. E. Ivanov High School of Natural Sciences and Mathematics, Kyustendil

16:00–16:30 **Coffee break**

16:30–17:45 **Oral session**

- 16:30–16:45 **8-O1:** Desired future profession: a factor influencing students' chemistry learning motivation at school V. Todorova, M. Kirova
- 16:45–17:00 **8-O2:** Attitudes of chemistry teachers to application of computer technologies in classes M. Kirova, M. Tsenova
- 17:00–17:15 **8-O3:** Increasing cognitive interests and professional competencies through chemical experiment N. Stambolieva
- 17:15–17:30 **8-O4:** Hydrocarbons educational products by students from Elisaveta Vazova Vocational Design School in Sofia G. Aralova
- 17:30–17:45 **8-O5:** Top emerging technologies in chemistry and education of chemistry and natural science in Bulgaria H. Hristov

16:30–18:00 **Poster session**

- 1-P1:** Hydrogen transfer processes in cytosine and isocytosine: a theoretical study T. D. Cherneva, I. G. Shterev, E. Horkel, V. B. Delchev
- 1-P2:** Antenna-effect mechanism in luminescent Ln(PDTC)₃phen (Ln ≡ Eu^{III}, Sm^{III}) complexes: the role of dithiocarbamate ions B. Borrisov, T. Zahariev, M. Tsvetkov, D. Elenkova, I. Georgieva
- 1-P3:** Electrochemical extraction and characterization of a recovery tin D. I. Fachikova, L. B. Fachikov
- 1-P4:** Preparation and painting of aluminium surfaces for marine atmospheres G. Ilieva, Z. Djumailieva, N. Kuzmova, D. Fachikova
- 1-P5:** Dielectric spectroscopy study of Na⁺-ion conducting PEO/E8/NaIO₄ salt-complexed polymer/liquid crystals composite T. E. Vlahkov, G. B. Hadjichristov, Y. G. Marinov
- 1-P6:** Anodization: a simple and versatile method for high textured surfaces formation S. Portolesi, C. Girginov, S. Kozhukharov
- 2-P1:** Ultrasound-assisted synthesis of inulin esters with capric acid and evaluation of its physico-chemical, antimicrobial and anti-complementary properties I. Hambarliyska, D. Vassilev, N. Petkova, Y. Tumbarski, I. Vlaeva, M. Ognyanov, P. Denev
- 2-P2:** Design, synthesis and anti-coronavirus activity of novel amides, containing isoquinoline heterocyclic system N. Burdzhiev, B. Borrisov, I. Nikolova, M. Kandinska

- 3-P1:** The theory for disperse structure of real crystals as a predecessor of the non-classical crystallization theories
Chr. Balarew, E. Nedeva
- 3-P2:** Study on the equilibria of complex formation of cobalt(ii) with 4-(2-thiazolylazo) resorzinol and nitron
V. Divarova, K. Stojnova, V. Lekova
- 3-P3:** Synthesis of layered copper-zinc hydroxide nitrate nanoparticles
K. Ivanov, E. Kolentsova, D. Dimitrov, D. Karashanova, N. C. Nguyen
- 3-P4:** Direct mechanochemical synthesis and characterization of SrWO₄ nanoparticles
M. Gancheva, R. Iordanova, L. Mihailov
- 3-P5:** Optical, photocatalytic and antibacterial properties of TiO₂/TeO₂/B₂O₃ nanopowders prepared by sol-gel technique
M. Peneva, A. Bachvarova-Nedelcheva, R. Iordanova, N. Georgieva, V. Nemska, Ts. Foteva, A. Stoyanova
- 4-P1:** ICP-OES: influence of plasma operating conditions on detection limits
N. S. Velitchkova, O. I. Veleva, M. G. Karadjov, E. N. Pentcheva, S. V. Velichkov, N. N. Daskalova
- 4-P2:** Study of mine tailings from Bulgarian industry as precursors for geopolymer materials
V. Yotova, L. Angelova, D. Ilieva, T. Radoikova, A. Surleva
- 4-P3:** Detection of hydroxyl and carboxyl derivatives of marine biotoxins in mussel samples from Bulgarian coast of the Black Sea
S. Georgieva, Z. Peteva, M. Stancheva, A. Georgieva
- 4-P4:** Theoretical sizing study of silver-based nanoparticles by spICP-MS using ionic calibration strategy
L. Kaynarova, D. Georgieva, V. Stefanova
- 4-P5:** New pyrene containing complexes with anticancer activity
A. Ahmedova, R. Mihaylova, A. Nedzhib, S. Stoykova, V. Mihaylova, G. Momekov, N. Burdzhiev
- 4-P6:** Hyphenation of PVG to MSIS-MP-AES for trace determination of mercury
D. Stoitsov, V. Kmetov
- 4-P7:** Sample preparation techniques for multielement analysis of solid waste materials using LA-ICP-MS method
I. Belovezhdova, V. Lyubomirova
- 4-P8:** Determination of element and anionic composition of surface waters and sediments by analytical methods: a comparative study
V. Lyubomirova, V. Mihaylova, I. Belovezhdova, B. Todorov, A. Kamusheva, R. Djingova
- 4-P9:** Ion imprinted polymers for uranium determination by solid phase extraction
V. Georgiev, I. Dakova, I. Karadjova
- 5-P1:** Cobalt-manganese oxides supported on ion-exchanged clinoptilolite for catalytic *n*-hexane oxidation
I. Hristova, S. Todorova, R. Velinova

- 5-P2:** Nano-sized cobalt oxide supported on Al₂O₃ and SiO₂ for preferential CO oxidation in hydrogen rich gases: influence of support and preparation method
S. Todorova, I. Hristova, D. Filkova, B. Grahovski, H. Kolev
- 5-P3:** Comparison of the photocatalytic efficiency of pure and fixed with silver ions ZnO thin films for degradation of Methylene Blue
D. Ivanova, N. Kaneva
- 5-P4:** Silver co-catalytic modified TiO₂ films for enhanced photodegradation of Methylene Blue
N. Kaneva, A. Bojinova, K. Papazova, B. Stefanov, B. Grahovsky, R. Mladenova, H. Kolev
- 5-P5:** Hydrogen production *via* water-gas shift reaction over Ni-Al layered double hydroxide promoted by Au, Cu, or Re
I. Ivanov, M. Gabrovska, D. Nikolova, K. Tenchev, A. Maria Venezia, T. Tabakova
- 6-P1:** Role of ferrous ions in multispecies biofilm formation
I. Ganchev
- 6-P2:** Complex approach to ecological assessment of Iskar River and its tributaries in the region of Sofia municipality of Bulgaria
A. Kovacheva, R. Gergulova, R. Ilieva, D. Rabadjieva, V. Nanev, I. Vladov
- 6-P3:** Occupational risk assessment of carcinogenic exposure in cement production
V. Kirova, S. Yaneva, N. Rangelova
- 6-P4:** Characterization of a material based on lemon balm in order to elucidate the adsorption mechanism of copper(II) ions
L. Ivanova, P. Vassileva, A. Detcheva
- 6-P5:** Sustainable recycling of platinum group metals
D. G. Paneva, Z. P. Cherkezova-Zheleva
- 7-P1:** Conversion of industrial hemp for biofuel and value-added products
S. Petrin, V. Toteva, I. Valchev
- 7-P2:** Preparation and surface characteristics of bioinspired antibacterial polymer coatings with included porphyrin-based photosensitizer
N. Philipova, R. Bryaskova
- 7-P3:** Hot acid treatment efficiency in hardwood pulp bleaching
P. Mileva-Petrova, I. Valchev
- 7-P4:** Flocculation accelerated by interval suspension addition
G. S. Georgiev, V. T. Toncheva
- 8-P1:** Transition from knowledge to skills in teaching chemistry and environmental protection
S. Angelova
- 8-P2:** Adaptive chemistry learning via a simple prognostic Bayesian model
N. Georgieva, V. Toncheva, G. Georgiev
- 8-P3:** The history of chemistry as a basis for active storytelling
N. Boboriko, E. Vasilevskaya

18.00–20.00 **Welcome reception at University of Chemical Technology and Metallurgy**

Friday, 24th June 2022

10.00–18.00 **Registration and information**

Asen Zlatarov Hall

11:00–11:45 **L3-Invited lecture:** A. Tafrova-Grigorova,
Are the expected learning outcomes in G. Shumanova
chemistry and environmental protection
attainable? Results of a national survey for
lower secondary stage

11:45–12:30 **L4-Invited lecture:** V. Beschkov,
Bioelectrochemical processes in industrial E. Razkazova-Velkova
biotechnology

12:30–14:00 **Lunch**

Hall 431

14:00–15:45 **Oral session**

14:00–14:15 **3-O1:** Synthesis and characterization of H. Hristov, P. Vasileva
organic-inorganic hybrid membranes
modified with gold nanoparticles

14:15–14:30 **4-O1:** Diversity in the coordination I. Pantcheva
chemistry of polyether ionophore
antibiotics

14:30–14:45 **4-O2:** Atomic absorption analysis of R. Tomova, S. Asenova,
copper and zinc and spectrophotometric L. Atanasova, B. Atanasova,
analysis of antioxidant activity in serum R. Nestorova, M. Nikolova,
of women with impair bone density M. Slavova

14:45–15:00 **6-O1:** The potential of CCS and CCU D. Panayotov, M. Mihailov,
technologies in mitigating climate change K. Hadjiivanov

15:00–15:15 **6-O2:** Influence of applied external voltage P. G. Velichkova, S. G. Bratkova,
on anaerobic digestion with outside A. T. Angelov
integrated microbial electrolysis cell

15:15–15:30 **6-O3:** Modelling of 1,2-dibromoethane P. Popova-Krumova,
biodegradation under constant electric V. Beschkov, E. Vasileva,
field T. Parvanova-Mancheva

15:30–15:45 **6-O4:** Impact of *Spirulina platensis* I. Ganchev, L. Dobрева
biomass on the viability of *Lactobacillus*
delbrueckii subsp. *bulgaricus* strain during
freeze-drying process

16:00–16:30 **Coffee break**

Hall 439

14:00–16:00 **Oral session**

- 14:00–14:15 **8-O6:** Teacher's role in the formation of metacognitive skills in students: a study's results N. Markova, E. Boiadjieva, V. Tzvetkov
- 14:15–14:30 **8-O7:** The role of chemistry in the refinement of worsted and thick fabrics Y. I. Kalosheva-Andonova, P. N. Petrov
- 14:30–14:45 **8-O8:** Physicochemical experiment for the formation of natural scientific literacy of students in primary school R. Georgieva Draganova-Hristova
- 14:45–15:00 **8-O9:** The place of microplastics issue in the Bulgarian chemistry curriculum Z. Peteva, S. Georgieva
- 15:00–15:15 **8-O10:** Opportunities for development of science literacy with a 10th grade chemistry textbook in French N. Y. Raycheva
- 15:15–15:30 **8-O11:** Chemistry: the big science for little minds S. Ferad
- 15:30–15:45 **8-O12:** A STEM lesson in chemistry education Z. Garova
- 15:45–16:00 **8-O13:** Laboratory exercises in module 4. Challenges and answers N. Stamenov
- 16:00–16:30 **Coffee break**
- 16:30–18:00 **Discussion:** Chemistry education for public understanding of science A. Tafrova-Grigorova, E. Boiadjieva
- 18:00–18:10 **Closing ceremony** V. Beschkov



Eleventh National
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30 TEAM