Twelfth National Conference on Chemistry

Twelfth National Conference on Chemistry

Chemistry for Building a Decarbonized Society

University of Chemical Technology and Metallurgy
25–26 September 2025, Sofia, Bulgaria

140th Anniversary
Federation of Scientific Engineering Unions in Bulgaria

Programme

Chemistry for building a decarbonized society

Honorary committee

V. Bankova, N. Denkov, K. Hadjiivanov, I. G. Ivanov, I. Juchnovski, T. Spassov, Ch. Tsvetanov

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Conference organizer

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Symposia titles and chairs

1. Physical chemistry and electrochemistry	G. Madjarova
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, Ch. Bonev
6. Chemical engineering and environmental protection	V. Beschkov
7. Biobased and synthetic polymers and bioproducts	R. Bryaskova, I. Spiridonov
8. Chemistry education	A. Tafrova-Grigorova M. Kirova

Twelfth National Conference on Chemistry

Schedule

Thursday, 25th September 2025

Hall 424

08:30–18:00	Registration and information
10:00–10:15	**Opening ceremony**: V. Beschkov
10:15–11:00	**L1-Invited lecture**: R. Stoyanova
11:00–11:30	**Coffee break**
11:30–12:15	**L2-Invited lecture**: S. D. Kolev
12:15–13:00	**Oral session**: Symposia 4,5
13:00–14:00	**Lunch**

Hall 424

14:00–15:00	**Oral session**: Symposium 5
15:00–15:30	**Coffee break**
15:30–16:10	**Oral session**: Symposia 1,7
16:10–18:00	**Poster session**: Symposia 3,4,5
18:00–20:00	**Welcome reception**

Friday, 26th September 2025

Hall 424

09:30–18:00	Registration and information
10:00–10:45	**L3-Invited lecture**: D. Stratiev
10:45–11:15	**Coffee break**
11:15–12:00	**L4-Invited lecture**: V. Beschkov
12:00–13:00	**Oral session**: Symposium 1, T.E.A.M
13:00–14:00	**Lunch**

Hall 424

14:00–15:20	**Oral session**: Symposia 2,3
15:20–15:50	**Coffee break**
15:50–17:50	**Poster session**: Symposia 1,2,6,7

Hall 431: Symposium 8

14:00–15:15	**Oral student session**
15:15–15:45	**Coffee break**
15:45–16:15	**Oral student session**
16:15–16:35	**Poster student session**
16:35–17:35	**Oral session**
17:35–17:50	**Poster session**

Hall 424: Closing ceremony

17:50–18:00 V. Beschkov

Chemistry for building a decarbonized society

Programme

Thursday, 25th September 2025

08:30–18:00	**Registration and information**	
Hall 424		
10:00–10:15	**Opening ceremony**	V. Beschkov, B. Velikov
10:15–11:00	**L1-Invited lecture**: Could sodium ion batteries be the key to transforming the clean energy storage race?	R. Stoyanova*, M. Kalapsazova, D. Marinova, V. Koleva, E. Zhecheva
11:00–11:30	**Coffee break**	
11:30–12:15	**L2-Invited lecture**: Polymer inclusion membranes and beads in environmentally friendly chemical separation	S. D. Kolev
12:15–12:55	**Oral session**	
12:15–12:35	**4-O1.** Determination of ascorbic acid in pharmaceuticals by flow analysis techniques	L. Kukoc-Modun*, M. Biocic
12:35–12:55	**5-O1.** Theoretical investigation of NO oxidation on ceria-based catalysts	H. A. Aleksandrov*, I. Z. Koleva, G. N. Vayssilov, J. Szanyi, K. Khivantsev
13:00–14:00	**Lunch**	
Hall 424		
14:00–15:00	**Oral session**	
14:00–14:20	**5-O2**. Synergistic effect in $SrTiO_3$/g-C_3N_4/Ag composite: an approach to enhance photocatalytic activity	D. Gagashev*, J. Zaharieva, M. Tsvetkov
14:20–14:40	**5-O3**. Reproducibility and validation of physicochemical characteristics of Cu-Zn-Al layered double hydroxide catalysts for one-step water-gas shift reaction	M. Gabrovska*, D. Nikolova, Ts. Parvanova-Mancheva, K. Tenchev, P. Tzvetkov, G. Zarkova
14:40–15:00	**5-O4.** CO oxidation on Pt/CeO_2 and Pt/γ-Al_2O_3: a DFT perspective	I. Z. Koleva*, H. A. Aleksandrov, G. N. Vayssilov
15:00–15:30	**Coffee break**	

15:30–16:10 **Oral session**

15:30–15:50	**1-O3.** 2D-conjugated (coordination) polymers as promising conductive materials. Insights from first-principle calculations	P. Petkov
15:50–16:10	**7-O1**. Bioactive natural phenolic acid-loaded electrospun polymeric fibrous materials with antimicrobial and antioxidant activity	M. Ignatova*, D. Paneva, I. Rashkov, N. Manolova, N. Markova

16:10–18:00 **Poster session**

3-P1. Finding a good electrolyte for improved electrochemical performance of sodium iron phosphates	T. Tushev*, V. Koleva, S. Harizanova, R. Stoyanova
3-P2. Recycling and converting biowaste into valuable electrode material for green sodium-ion battery	Ts. Gerasimova*, S. Harizanova, R. Stoyanova, M. Kalapsazova
3-P3. Comparison of different methods for delivering spherical magnetic particles	T. Sandu, S. V. Dolana, A. Sârbu, E. B. Stoica, A. M. Pană, A. L. Chiriac, A. Zaharia, D. G. Mitrea, I. Atkinson, B. Tsyntsarski*, G. Georgiev
3-P4. Effect of thallium(I) ions on biological performance of polyether ionophores salinomycin and monensin	I. Pantcheva*, N. Petkov
3-P5. Investigation of iron solvent extraction by chelating ligands	L. Mzek*, M. Atanassova, N. Todorova, V. Kurteva, S. Todorova
3-P6. Effects of high doses gamma irradiation on the structure of chrome-tanned pigskin	K. Bineva*, E. Dimitrova, Z. Zhelyazkov, B. Todorov, P. Kovacheva
3-P7. Electron paramagnetic resonance and electrochemical impedance spectroscopy of cathode material with composition $Na_{2/3}Mg_{1/3}Mn_{2/3}O_2$	R. Kukeva*, M. Kalapsazova, R. Stoyanova
3-P8. Investigation of the structural characteristics of some rare-earth cuprate phases (Ln_2CuO_4 and $Ln_2Cu_2O_5$) using Rietveld analysis	P. Nikolov*, M. Tsvetkov
3-P9. Effects of gamma irradiation on the structure and radical formation of books	Z. Zhelyazkov*, E. Dimitrova, P. Kovacheva

3-P10. Side effects of high doses of gamma radiation on the structure of calfskin and suede	E. Dimitrova*, K. Bineva, Z. Zhelyazkov, B. Todorov, P. Kovacheva
3-P11. Effect of Eu^{3+} concentration on sol-gel synthesis and properties of SiO_2-B_2O_3 glasses	H. Lalkovski*, L. Aleksandrov, A. Bachvarova-Nedelcheva
4-P1. Microcystin-LR as a new parameter under the revised EU drinking water Directive (2020/2184)	M. Mitreva*, V. Pavlova
4-P2. Solid-phase extraction and GC-MS/MS determination of PAHs in sewage sludge	V. Lyubomirova*, I. Belovezhdova, A. Kamusheva, P. Ignatov, P. Tuhchiev, S. Draganova, T. Kitancheva, M. Mikova
4-P3. Combination of cloud point extraction with GC-MS/MS for PAHs analysis: optimization of the instrumental measurement	A. Ivancheva, K. Simitchiev, A. Hristozova*
4-P4. Comparative study for effectiveness of ultrasound- and microwave-assisted extraction procedures utilizing TMAH as extraction agent for ICP-MS element determination in biological matrices	N. Boynin, E. Varbanova, L. Kaynarova-Krasteva, V. Pandeva*, D. Georgieva
4-P5. Optimization of dispersive liquid-liquid micro extraction of lanthanides with natural deep eutectic solvent	E. Varbanova*, G. Dzangova, D. Georgieva, A. Hristozova, V. Stefanova
5-P1. Tribocatalysis for doxycycline removal using hydrothermal and sol-gel ZnO and ZnO/Eu_2O_3 powders	H. Kolev*, D. Ivanova, N. Kaneva, R. Mladenova, Z. Cherkezova-Zheleva
5-P2. Synthesis and characterization of pure and Ho^{3+}-doped ZnO sol-gel powders for tribocatalytic degradation of paracetamol in distilled and tap water	S. Petrova*, N. Kaneva, A. Bachvarova-Nedelcheva[1]
5-P3. Effect of acid treated La-Sr-Fe perovskite-related catalysts on VOCs oxidation	T. Petrova, K. Tumbalova, R. Velinova*, G. Ivanov, N. Velinov, H. Kolev, D. Kovacheva, I. Spassova, A. Naydenov
5-P4. DFT study of the interaction between carbon monoxide and transition metal nanoparticles	P. V. Koleva*, I. Z. Koleva, H. A. Aleksandrov
5-P5. Upgrading of bioalcohols by zeolite catalyzed Guerbet condensation	R. Palcheva, L. Kaluza, P. Shestakova, J. Moravcik, A. Lyutskanova*, Y. Kalvachev, G. Tyuliev
5-P6. Ozone decomposition on Al_2O_3-CaO-supported NiO, CoO, and CuO catalysts	K. Milenova*, I. Avramova, K. Aleksieva, P. Karakashkova

5-P7. Synthesis and characterization of TiO_2/graphene oxide nanocomposites with enhanced photocatalytic activity	P. Karakashkova*, M. Mitreva, K. Zaharieva, M. Shopska, I. Yordanova, G. Tyuliev, S. Minkovska
5-P8. Preparation and catalytic ability of manganese carbonate ore/silver composites	K. Zaharieva, P. Karakashkova*, R. Titorenkova, V. Kostov-Kytin, P. Todorova, I. Yordanova
5-P9. Molecular photochromic switches based on substituted spirooxazines for selective detection of metal ions	S. Minkovska*, G. B. Hadjichristov, P. Karakashkova, A. Neacsu, V. Alexiev, V. Chihaia

18:00–20:00 **Welcome reception at University of Chemical Technology and Metallurgy**

Friday, 26th September 2025

09:30–18:00 **Registration and information**

Hall 424

10:00–10:45	**L3-Invited lecture**: Influence of the characteristics of feedstocks derived from fossil and biological sources on the performance of fluid catalytic cracking	D. Stratiev
10:45–11:15	**Coffee break**	
11:15–12:00	**L4-Invited lecture**: Perspectives on the development of technologies for hydrogen as a carrier of sustainable energy	V. Beschkov*, E. Ganev
12:00–13:00	**Oral session**	
12:00–12:20	**1-O1.** Gas separation membranes based on carbon nitrides: modelling and performance analysis	J. Petkova*, I. Mijakov, E. Simeonova, G. Madjarova
12:20–12:40	**1-O2.** A new approach to battery stack emulation	D. Boychev*, B. Burdin, D. Vladikova
12:40–13:00	**Company presentation**: T.E.A.M. Ltd.: analytical solutions empowering chemists for a decarbonized society	K. Doktorov
13:00–14:00	**Lunch**	

Hall 424

14:00–15.20	**Oral session**	
14:00–14:20	**2-O1**. Synthesis of new naphtho[1,2] imidazoles, naphtho[1,2]imidazolium salts, and naphthoimidazolylidene palladium complexes with potential application in cross-coupling reactions	M. Ivanova*, R. Lyapchev
14:20–14:40	**2-O2**. Stereoselective Wittig reaction: coumarin-based phosphonium salts as key intermediates	D. S. Saralieva, N. I. Petkova-Yankova*, A. I. Koleva, R. D. Nikolova
14:40–15:00	**3-O1**. Direct reuse of NdFeB magnets as a sustainable strategy for rare earth element circularity	Z. Cherkezova-Zheleva*, D. Paneva, R. R. Piticescu, S. G. Ghalamestani, G. Heunen, O. Jay
15:00–15:20	**3-O2**. Synthesis and characterization of a new type of fluorescent materials based on $Y_{2-x}Tb_xHf_2O_7$	A. Surchev*, P. Nikolov, M. Tsvetkov
15:20–15:50	**Coffee break**	

15:50–17:50 **Poster session**

1-P1. Step meandering: Balance between the potential well and the Ehrlich-Schwoebel barrier	H. Popova*, M. Chabowska, M. Załuska-Kotur
1-P2. Interligand charge transfer: 'Friend' or 'Foe' to the antenna effect in luminescent complexes of Eu(III) with organic chromophores	T. Zahariev*, I. Georgieva, N. Trendafilova
1-P3. Electrochemical preparation of NiFeCu and NiFeCoCu alloys and their characterization as catalysts for hydrogen generation in 6M KOH	D. Goranova
2-P1. Synthesis and characterization of nitro-functionalized hydroxyl-terminated polybutadiene	V. Bakov*, S. Yaneva, N. Rangelova, M. Berner, N. Georgiev
2-P2. Substituent-driven conformational changes in coumarin dimers	A. I. Koleva, N. I. Petkova-Yankova, R. D. Nikolova*
2-P3. Computational evaluation of COX-1 binding by EPA, DHA, and AA using blind rigid-body docking	R. Stancheva*, I. Iliev, V. Panayotova, A. Merdzhanova, S. Georgieva
2-P4. Concise synthesis of pseudane IX, its N-oxide, and novel carboxamide analogues with antibacterial activity	P. Angelov, Y. Mollova-Sapundzhieva, F. Alonso, B. Goranov, P. Nedialkov, D. Bachvarova*

2-P5. Computational evaluation of bexarotene alkyl esters through DFT and molecular docking	N. Toshev*, I. Iliev, N. Agova, K. Mihalev, A. Abdoulahi, S. Fotkova
2-P6. Cyclization modes in anilides of N-protected 3-oxo-4-phenylaminobutyric acid under Knorr conditions	P. Angelov, Y. Mollova-Sapundzhieva*
2-P7. Chelation reaction vs. isotope exchange for production of effective receptor-targeted radiopharmaceuticals	G. Simeonova*, T. Trifonova
6-P1. Mechanochemical approaches toward greening of platinum group metal recovery	A. Vasileva*, K. Ivanov, D. Paneva, A. M. Moschovi, I. Yakoumis, Z. Cherkezova-Zheleva
6-P2. Utilizing friction energy on snowflakes (zinc oxide and zinc oxide/neodymium oxide) for tribocatalytic degradation of doxycycline	Y. Toncheva, D. Ivanova, N. Kaneva*
6-P3. Optimization of spent automotive catalyst recycling through mechanochemistry	K. Ivanov*, A. Vasileva, D. Paneva, A. M. Moschovi, Z. Cherkezova-Zheleva, I. Yakoumis
6-P4. Assessment of decarbonization potential in blast furnace ironmaking via pulverized coal and hydrogen injection	D. Grigorova
6-P5. Complete utilization of biomass and polymer waste via conversion to nanoporous carbons	B. Tsyntsarski*, I. Stoycheva, B. Petrova, N. Petrov, G. Georgiev, T. Sandu, A. Sarbu, S.-V. Dolana, D.-G. Mitrea, U. Szeluga
7-P1. Investigation of the properties and quality of barrier coatings applied on papers	I. Spiridonov*, R. Boeva, T. Chakov, G. Radeva, P. Mileva
7-P2. Kinetics study of softwood cooking for bleached pulp production	S. Petrin, S. Kuzeva, I. Gavrilov, G. Radeva*, P. Mileva-Petrova, I. Valchev
7-P3. Temperature-time and concentration dependences of mild dilute acid hydrolysis	I. Gavrilov*, S. Petrin, P. Mileva-Petrova, G. Radeva, I. Valchev
7-P4. Preparation and characterization of nano- and microparticles of hemoglobin derivatives	G. Yordanov*, N. Angelova, M. Kostadinov, S. Panaiotov
7-P5. Deposition of zinc nanoparticles on woolen substrates in footwear	D. Zheleva*, D. S. Angelova
7-P6. Preparation and characterization of sol-gel derived silica-technical hydrolysed lignin composites	S. Yaneva*, N. Rangelova, I. Valchev

7-P7. Physicochemical characterization of biological sludge		M. Mladenov*, S. Yaneva

Hall 431 **Symposium 8**

14:00–15:15	**Oral student session**	
14:00–14:15	**8-O1s**. Aluminium: the wonderful metal that shaped modern civilization	Z. Zidarov (11th grade)
14:15–14:30	**8-O2s**. The chemistry of banknotes and coins	I. Borisov (10th grade)
14:30–14:45	**8-O3s**. Money: history and necessity	M. A. Aleksandrova (7th grade)
14:45–15:00	**8-O4s**. Use of aluminium in jewelry. Jewelry made of aluminium wire	T. Y. Yakimova (11th grade)
15:00–15:15	**8-O5s**. The fatal 13	G. L. Gichev (8th grade)
15:15–15:45	**Coffee break**	
15:45–16:15	**Oral student session**	
15:45–16:00	**8-O6s**. Bulgaria's name for longevity	S. S. Kraishnikova (8th grade)
16:00–16:15	**8-O7s**. Analysis of natural waters in our hometown	N. D. Urumov (10th grade)
16:15–16:35	**Poster student session**	
8-P1s. Aluminium in cryogenics		D. Ankov*, I. Petkova* (10th grade)
8-P2s. The secret chemistry of Swiss banknotes		I. G. Nikolova (11th grade)
8-P3s. The metal of elegance: aluminium in modern jewelry		V. M. Popovska (11th grade)
16:35–17:35	**Oral session**	
16:35–16:55	**8-O1.** Specialized chemistry education in secondary school: past glory or present greatness	N. Angelova, E. Boyadjieva, A. Kamusheva*, M. Kirova
16:55–17:15	**8-O2.** Enhancing STEM motivation in 5th–7th-grade learners through personalised VR/AR and Arduino projects	F. Kunis*, M. Stoyanova
17:15–17:35	**8-O3.** Content analysis of physics and astronomy curricula for grades 9–12: a comparative study between 2003 and 2025	F. Kunis*, M. Stoyanova, I. Kotseva, M. Gaydarova

17:35–17:50 **Poster session**

8-P1. Young people's interests and attitudes toward teaching profession	A. Petrina*, S. Traykova-Parhomenko

Hall 424

17:50–18:00 **Closing ceremony**

АКВАХИМ
AQUACHIM

AQUACHIM JSC is a Bulgarian private company founded by Assoc. Prof. Dr. Borislav Velikov. AQUACHIM provides customers with high quality complex solutions for industrial plants, medical and analytical laboratories, and pharmaceuticals; promotion, distribution and delivery of chemicals, reagents, drugs, instruments, and consumables; laboratory design and delivery of different measurement systems and laboratory equipment. Recently AQUACHIM specialized in the field of green energy sources and in particular design, engineering, and construction of installations for hydrogen production and refueling of light and heavy hydrogen vehicles.

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Twelfth National Conference on Chemistry

140 years of the Federation of Scientific and Engineering Unions in Bulgaria

The first Bulgarian Technical Society was established in Ruse on 26 March 1885. The Bulgarian technical intelligentsia has gone through many stages in its development, and the scientific and technical movement has undergone various organizational changes. Its legal successor today is the Federation of Scientific and Engineering Unions in Bulgaria (FSEU). FSEU is the oldest public organization in this country. Today it unites 19 scientific and technical unions and 31 territorial organizations. FSEU is a co-founder and member of the World Federation of Engineering Organizations and a member of the European Federation of National Engineering Associations. It is the successor of the Union of Bulgarian Engineers and Architects and, respectively, of its predecessor, the Bulgarian Engineering and Architectural Society (БИАД).

Principal organizers

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