

Ministry of Science and Higher Education of the Russian Federation  
Ivanovo University of Chemistry and Technology  
Research Institute of Macrocyclic Compounds, Ivanovo State University  
of Chemistry and Technology  
Russian Academy of Sciences  
G.A. Krestov Institute of Solution Chemistry, Russian Academy of Sciences  
D.I. Mendeleev Russian Chemical Society

**XV International Conference  
“Synthesis and application of porphyrins  
and their analogs” (ICPC-15)**

**XIV School of Young Scientists  
on the chemistry of porphyrins  
and related compounds**

**S C I E N T I F I C P R O G R A M**

**June 24 – June 29, 2024**

**<https://conf.isuct.ru/ICPC15>**

Ivanovo

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<b>Girichev G.V.</b>	Professor, Dr Sc,., Ivanovo, Russia
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<b>Islyaikin M.K.</b>	Professor, Dr Sc, Ivanovo, Russia
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<b>Ageeva T.A.</b>	Associate Professor, Cand. Sc., Ivanovo, Russia
<b>Malyasova A.S.</b>	Associate Professor, Cand. Sc, Ivanovo, Russia

# SCIENTIFIC PROGRAM

## June 24 (Monday) 2024

### AUD. G-203

**10.00 – 11.30** Registration of conference participants

**12.00 – 13.30** Scientific Council devoted to the 80th anniversary of the birth of Academician of the Russian Academy of Sciences **Koifman O.I.**

**13.30** Opening ceremony of the memorial plaque of **Koifman O.I.**

## June 25 (Tuesday) 2024

### AUD. G-203

**8.30 – 9.00** Registration of the conference participants

**Chairman – Stuzhin P.A.**

**9.00 – 9.40** Academician of Russian Academy of Sciences **Gorbunova Y.G.**  
(*Moscow, Russia*)  
Molecular bases of action of nanophototherapeutic agents of phthalocyanine series

**9.40 – 10.20** Academician of Russian Academy of Sciences **Kukushkin V.Y.**  
(*St. Petersburg, Russia*)  
 $\sigma$ - and  $\pi$ -hole interactions in chemistry

**10.20 – 10.50** **Burmistrov V.A.** (*Ivanovo, Russia*)  
Supramolecular chirality of meso-tetraarylporphyrins in solutions and liquid crystals.

**10.50 – 11.10** Coffee break

**Chairperson – Zenkevich E.I.**

**11.10 – 11.50** **Jianzhuang Jiang** (*Beijing, China*)  
Tetrapyrrole-based covalent organic frameworks and beyond

**11.50 – 12.20** **Mamardashvili N.Zh.** (*Ivanovo, Russia*)  
Multifunctional tetrapyrrole macrocyclic compounds: synthesis, properties and practical application possibilities

**12.20 – 12.40** **Filonenko E.V.** (*Moscow, Russia*)  
Photodynamic diagnostics and therapy in clinical oncology

**12.40 – 13.00 Lomova T.N.** (*Ivanovo, Russia*)  
Molybdenum(V) porphyrins for practical applications

**13.00 – 14.00 Dinner**

**Chairman – Burmistrov V.A.**

**14.00 – 14.40 Kruk N.N.** (*Minsk, Belarus*)  
Pyrrole nitrogens pyramidalization in macroheterocycles: examples, significance and prospects for us

**14.20 – 14.40 Yakubov M.R.** (*Kazan, Russia*)  
Features of the composition of petroleum vanadylporphyrins

**14.40 – 15.00 Weihua Zhu** (*Zhenjiang, China*)  
Surface Engineering of Co<sup>II</sup>porphyrins/Co<sup>III</sup>corroles towards Enhanced Electrocatalytic Water Splitting

**15.00 – 15.20 Pushkarev V.E.** (*Chernogolovka, Russia*)  
Prospects for cycl[3.2.2]azines as the basis for n-extended systems

**15.20 – 15.40 Konarev D.V.** (*Chernogolovka, Russia*)  
Design of magnetic assemblies based on metallomacrocycles

**15.40 – 16.00 Girichev G.V.** (*Ivanovo, Russia*)  
Molecular structure of macroheterocyclic compounds based on pyrrole and isoindole: gas versus crystal

**16.00 – 16.20 Coffee break**

**Chairman – Islyaikin M.K.**

**16.20 – 16.35 Pakhomov G.L.** (*Nizhny Novgorod, Russia*)  
Features of phthalocyanine growth on cold substrates

**16.35 – 16.50 Skvortsov I.A.** (*Ivanovo, Russia*)  
Subphthalocyanines, their analogs and hybrids as fluorescent acidity switchers and perspective photocatalysts

**16.50 – 17.05 Faraonov M.A.** (*Chernogolovka, Russia*)  
Coordination complexes of metal phthalocyanines: synthesis, crystal structure, optical and magnetic properties

**17.05 – 17.20 Zaitseva S.V.** (*Ivanovo, Russia*)  
Coordination and redox properties of dimeric tetrapyrrole macrocyclic transition metal complexes

**17.20 – 17.35 Tarakanov P.A.** (*Chernogolovka, Russia*)  
Anti-kasha effect in low-symmetry porphyrazines

- 17.35 – 17.50 Mikhailov O.V.** (*Kazan, Russia*)  
Stabilization of higher 3D element oxidation states with the participation of porphyrazine and its analogues: quantum chemical design
- 17.50 – 18.05 Mamardashvili G.M.** (*Ivanovo, Russia*)  
Micelles of ionogenic surfactants as a means of controlling the properties of hydrophilic porphyrins
- 18.05 – 18.20 Volostnykh M.V.** (*Moscow, Russia*)  
Diphosphorylated pyrazines: uncommon synthesis and structural features
- 18.20 – 18.35 Derevenkov I.A.** (*Ivanovo, Russia*)  
Reactivity of meso-halogenated corrinoids
- 18.35 – 18.45 Bazanov M.I.** (*Ivanovo, Russia*)  
Oscar Iosifovich Koifman and electrochemistry

## June 26 (Wednesday) 2024

### AUD G-203

#### Role of porphyrins in medicine (PDT)

#### Chairman – Berezin D.B.

- 9.00 – 9.30 Grin M.A.** (*Moscow, Russia*)  
Functionalized derivatives of natural chlorins for the creation of theranostics in medicine
- 9.30 – 10.00 Lebedeva N.Sh.** (*Ivanovo, Russia*)  
Prospects of using asymmetric water-soluble porphyrins for pathogen inactivation
- 10.00 – 10.30 Krasnovskiy A.A.** (*Moscow, Russia*)  
Detection of photosensitizing action of c40 carotenoids in bacteria: mechanisms and dependence on the number of conjugated double bonds
- 10.30 – 10.50 Martynov A.G.** (*Moscow, Russia*)  
Modern quantum-chemical approaches to design and interpretation of properties of photosensitizers based on phthalocyanines and their analogs
- 10.50 – 11.10 Coffee break**

**Chairman – Grin M.A.**

- 11.10 – 11.30 Berezin D.B.** (*Ivanovo, Russia*)  
Strategy for developing a promising photosensitizer: from molecular design to clinical trials
- 11.30 – 11.50 Belykh D.V.** (*Syktyvkar, Russia*)  
Formation of cationic groups on the periphery of the macrocycle of natural chlorines in the synthesis of potential antitumor and antibacterial photosensitizers
- 11.50 – 12.10 Kustov A.V.** (*Ivanovo, Russia*)  
Antitumor photodynamic therapy with the chlorin-type photosensitizers in the ivanovo region: achievements, problems, outlooks
- 12.10 – 12.30 Bragina N.A.** (*Moscow, Russia*)  
Biomedical capability of amphiphilic porphyrins with pyridyl moieties
- 12.30 – 12.45 Nychev A.V.** (*Nizhny Novgorod, Russia*)  
Photo- and enzymatically- cleavable water-soluble conjugates of natural and synthetic porphyrins for combined photodynamic and targeted therapy
- 12.45 – 13.00 Ostroverhov P.V.** (*Moscow, Russia*)  
Conjugates of natural chlorins with antitumor drugs for polytherapy in oncology

**13.00 – 14.00 Dinner**

**Chairman – Syrbu S.A.**

- 14.00 – 14.20 Dubinina T.V.** (*Moscow, Russia*)  
Photosensitizers based on boron subphthalocyanines and their azaanalogs, functionalized by drugs: synthesis and photodynamic activity
- 14.20 – 14.35 Kozlov A.V.** (*Chernogolovka, Russia*)  
The role of various reactive oxygen species in the realization of the phototoxic effect of photosensitizers of types I and II
- 14.35 – 14.50 Rybkin A.Yu.** (*Chernogolovka, Russia*)  
Nanoparticles based on amphiphilic copolymers of n-vinylpyrrolidone and dyes PASAL and pheophorbide as promising agents for phototeranostics
- 14.50 – 15.05 Sheinin V.B.** (*Ivanovo, Russia*)  
Acid-base ionization of PS chlorin e6: the effect of pH on optical spectra,  $P_{[O_2]/[PBS]}$  and  $^1O_2$  generation

- 15.05 – 15.20 Davydov E.V.** (*Moscow, Russia*)  
Photodynamic therapy of spontaneous squamous cell carcinoma of the oral cavity in animals using a bacteriochlorin composition as a photosensitizer
- 15.20 – 15.35 Suvorov N.V.** (*Moscow, Russia*)  
Development of cationic photosensitizers based on chlorophyll derivatives for antimicrobial photodynamic therapy
- 15.35 – 15.50 Panchenko P.A.** (*Moscow, Russia*)  
Naphthalimide-based bichromophoric systems for fluorescence imaging

**15.50 – 16.10 Coffee break**

**Chairperson – Belykh D.V.**

- 16.10 – 16.25 Antina L.A.** (*Ivanovo, Russia*)  
Hydrophobic bodipy photosensitizers and their water-soluble forms based on pluronic® micelles
- 16.25 – 16.40 Zhdanova K. A.** (*Moscow, Russia*)  
Synthetic strategies towards egfr-targeted conjugates based on amphiphilic meso-arylporphyrins and its photodynamic activity
- 16.40 – 16.55 Zamilatskov I.A.** (*Moscow, Russia*)  
Formyl, Vinyl, and Ethynyl Porphyrins: Essential building blocks for novel Meso-Functionalized Tetrapyrrole Derivatives
- 16.55 – 17.10 Klapshina L.G.** (*Nizhny Novgorod, Russia*)  
Novel Rigidochromic and Anti-Kasha Dual Emission Fluorophores Based on D- $\pi$ -A Dyads as the Promising Materials for Potential Applications Ranging from Optoelectronic and Optical Sensing to Biophotonics and Medicine
- 17.10 – 17.25 Yurina E.S.** (*Ivanovo, Russia*)  
A new strategy for the deposition of nucleic acids using asymmetrically substituted cationic porphyrin

**17.30 – 19.00 Poster session**

**June 27 (Thursday) 2024**

**CHEM HALL**

**Chairman – Mamardashvili N.Zh.**

- 9.00 – 9.30 Hailong Wang** (*Beijing, China*)  
Crystalline porphyrin porous organic materials for elucidating the relationship of structures and properties

**9.30 – 10.00** **Zenkevich E.I.** (*Minsk, Belarus*)  
Peculiarities of photoinduced electron transfer in nanoassemblies containing porphyrin macrocycles

**10.00 – 10.30** **Kang Wang** (*Beijing, China*)  
Functional Covalent Organic Frameworks for Efficient Ion Storage

**10.50 – 11.10** **Islyaykin M.K.** (*Ivanovo, Russia*)  
Expanded porphyrinoids – case of hemihexaphyrzines. Synthesis, structure, outstanding coordination features, potential applications

**11.30 - 12.30** **Dinner**

**13-00 - 18.00** **Excursion**

**19.00** **Gala dinner**

## 28 June (Friday) 2024

### AUDITORY G – 203

#### Chairman – Krasnovsky A.A.

**9.00 – 9.20** **Stuzhin P.A.** (*Ivanovo, Russia*)  
Halogenated subporphyrzines

**9.20 – 9.40** **Maiorova L.A.** (*Ivanovo, Russia*)  
Self-assembly of tetrapyrroles at interfaces

**9.40 – 10.00** **Xu Liang** (*Zhenjiang, China*)  
Rational Design of M-N-C Catalysts for Overall Water Splitting and Nitrogen Reductions

**10.00 – 10.15** **Dudkin S.V.** (*Moscow, Russia*)  
Hybrid phthalocyaninato-pseudoclatrochelates of iron, nickel(II) and cobalt(III) - new efficient catalysts of thioanisole photooxidation

**10.15 – 10.30** **Zhabanov Yu.A.** (*Ivanovo, Russia*)  
Molecular structure of macrocycles promising for organic electronics

**10.30 – 10.45** **Ivanova S.S.** (*Ivanovo, Russia*)  
Comparative study of silicon(iv) complexes with porphyrzine and corrolazine macrocycles

**10.45 – 11.00** **Coffee break**



## JUNIOR SECTION

### Chairman – Kuřtov A.V.

- 11.00 – 11.10 Chufarin A. E.** (*Ivanovo, Russia*)  
Octacarboxy tetrapyrazinoporphyrine as perspective building blocks for metal-organic frameworks
- 11.10 – 11.20 Fazlyeva A.M.** (*Ivanovo, Russia*)  
Synthesis of first diazatripyrrins by deborylation and ring-opening of boron(III) subporphyrines
- 11.20 – 11.30 Yucheng Jin** (*Beijing, China*)  
Metallophthalocyanine based Crystalline Materials for Catalytic Performance
- 11.30 – 11.40 Kovkova U.P.** (*Ivanovo, Russia*)  
Low-symmetry pyrazine analogues of peripherally chlorinated subphthalocyanine
- 11.40 – 11.50 Lazovskiy D.A.** (*Ivanovo, Russia*)  
Phosphorus(V) porphyrine, derived corrolazines and diazatripyrrine composites: spectral and sensor properties
- 11.50 – 12.00 Belyakova E.Y.** (*Ivanovo, Russia*)  
Diiodo-substituted meso-BODIPY esters as effective photosensitizers
- 12.10 – 12.20 Bychkova A.N.** (*Ivanovo, Russia*)  
Synthesis and properties of complexes of d- and f-metal phthalocyanines containing azochromophores
- 12.10 – 12.20 Dogadaeva S.A.** (*Ivanovo, Russia*)  
(Br)<sub>2</sub>-BODIPY photosensitizers: influence of functionalization features on photophysical, photochemical characteristics and aggregation behavior in solutions
- 12.20 – 12.30 Zakharov N.S.** (*Tula, Russia*)  
5,10,15,20-tetrakis(4-hydroxyphenyl)-porphyrin complex polymer compound with iron (II) as an electrocatalyst for oxygen reduction
- 12.30 – 12.40 Kuzmin I.A.** (*Ivanovo, Russia*)  
Electronic structure of 5.10.15.20-tetraphenyl-21-X, 23-Y porphyrins (X=O or S; Y=N or S)
- 12.40 – 12.50 Nazarov D.I.** (*Chernogolovka, Russia*)  
Binuclear coordination assemblies of metal tetraphenylporphyrins: synthesis, crystal structure, optical and magnetic properties

**12.50 – 13.00** **Mozgova V.A.** (*Ivanovo, Russia*)  
 Octacarbazole-substituted cobalt(II), zinc(II) and manganese(III) phthalocyanines: synthesis, spectral properties, and reactivity

**13.00 – 14.00** **Dinner**

**Chairman – Lomova T.N.**

**14.00 – 14.10** **Nikitin I.A.** (*Ivanovo, Russia*)  
 DFT and TD dft study of the molecular structure and spectral properties of oxodiboron(III) tert-butyl phthalocyanine

**14.10 – 14.20** **Ibragimova A.A.** (*Moscow, Russia*)  
 A new method for studying dye aggregation on an example of 2-hydroxyphthalocyanines

**14.20 – 14.30** **Romanenko N.R.** (*Chernogolovka, Russia*)  
 Synthesis and study of multinuclear complexes with several paramagnetic centers on the basis of metallophthalocyanines

**14.30 – 14.40** **Rychikhina E.D.** (*Ivanovo, Russia*)  
 Si(IV) complexes of porphyrazine and corrolazine with pyrazine-annulated rings

**14.40 – 14.50** **Finogenov D.N.** (*Ivanovo, Russia*)  
 Perhalogenated tpyzpz and pcs as perspective compounds in various applications

**14.50 – 15.00** **Tihonov S.I.** (*Moscow, Russia*)  
 Design and development of new photosensitizers and onco-targets inhibitors based on aminoxybenzenes

**15.00 – 15.10** **Sarvin I.A.** (*Ivanovo, Russia*)  
 Investigation of spectral-luminiscent properties of Mg and Zn with phthalocyanine complexes containing piperazine fragments in the containment

**15.10 – 15.20** **Svetsova A.V.** (*Ivanovo, Russia*)  
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**15.20 – 15.30** **Solovieva E. V.** (*St. Petersburg, Russia*)  
 Molecular plasmonic hybrids based on porphyrins and gold nanoparticles

**15.30 – 15.40** **Skorobogatkina I.A.** (*Ivanovo, Russia*)  
 pH - controlled self-association of 5-[4'-(1'',3''-benzooxazol-2'''-yl)phenyl]-10,15,20-tris(4''-sulfophenyl)porphyrin

**15.40 – 16.00** **Summarizing and closing of the conference**

# POSTER SESSION

June 26 (Wednesday) 2024

17.30 – 19.00

Hall of the 2nd floor

Chairman – Danilova E.A.

stand number	Report title
1.	<b>Bukreeva T.V.</b> ( <i>Moscow, Russia</i> ) Derivatives of vitamin B <sub>12</sub> in protein carriers
2.	<b>Belyakova E.Y.</b> ( <i>Ivanovo, Russia</i> ) Halogen-substituted BODIPY carboxylic acids as potential theranostic agents: synthesis, spectral luminescent characteristics, photo- and pH stability, lipophilicity
3.	<b>Berezin D.B.</b> ( <i>Ivanovo, Russia</i> ) Thermal stability and acid-base properties of B-alkylsubstituted sapphyrin dicationic salts
4.	<b>Berezin D.B.</b> ( <i>Ivanovo, Russia</i> ) Intramolecular charge transfer and photophysical features of chlorin-dioxidine conjugates
5.	<b>Berezina N.M.</b> ( <i>Ivanovo, Russia</i> ) Electrochemical behavior of BF <sub>2</sub> -dipyrrolylmethenes in an aqueous-alkaline electrolyte
6.	<b>Bondareva T.V.</b> ( <i>Ivanovo, Russia</i> ) Fluorescence quenching mechanism of charged chlorin photosensitizers in micellar aqueous solutions of tween 80
7.	<b>Eroshin A.V.</b> ( <i>Ivanovo, Russia</i> ) Geometric structure of octaethylporphyrin and its complex with palladium according to quantum chemistry and gas electronography
8.	<b>Faraonov M.A.</b> ( <i>Chernogolovka, Russia</i> ) Crystalline complexes based on reduced copper (II) phthalocyanines with different degree of fluorination
9.	<b>Galochkina N.E.</b> ( <i>Nizhny Novgorod, Russia</i> ) New photosensitizers based on e <sub>6</sub> chloride derivatives with galactose fragments on the periphery of the macrocycle

10. **Gusev A.S.** (*Ivanovo, Russia*)  
Synthesis of mixed-substituted porphyrins
11. **Ivanova S.S.** (*Ivanovo, Russia*)  
Zinc(II) complexes of 4-carboxyphenyl substituted porphyrazine and its ester
12. **Khudyaeva I.S.** (*Syktyvkar, Russia*)  
Conjugates of chlorophyll A derivatives with l-arginine: synthesis and biological activity
13. **Khudyaeva I.S.** (*Syktyvkar, Russia*)  
Conjugate synthesis and study of the biological properties of the cationic derivative of chloride E6 with dioxydine
14. **Kirichenko D.A.** (*Krasnoyarsk, Russia*)  
Intraoperative staining of lung cancer using photoditazine encapsulated in liposomes and modified with aptamer LC17
15. **Kishalova M.B.** (*Ivanovo, Russia*)  
Formation of hydroxylated bacteriochlorin and chlorin derivatives at interfaces
16. **Knyazeva A.A.** (*Ivanovo, Russia*)  
Geometric and electronic structure of octa(4-propylphenoxy)phthalocyanine and its metal complex with Ga(III)
17. **Kulikova O.M.** (*Ivanovo, Russia*)  
Nanoconjugates of  $Zn(x-MePy^+)_4PS$  with  $AgInS_2/ZnS/GS^{+/-}$  QDs<sup>578</sup> : synthesis, structure,  $^1O_2$  generation
18. **Kurochkin I.Yu.** (*Ivanovo, Russia*)  
Conformational diversity and geometric structure of the 1,2-diphenoxyethane molecule
19. **Kustov A.V.** (*Ivanovo, Russia*)  
Generation of singlet oxygen by the chlorin-type photosensitizers in an aqueous and lipid-like environment
20. **Kuzmina A.A.** (*Ivanovo, Russia*)  
Quantum chemical optimization of the geometry of aliphatic chains of e6 chloride esters and their Ni complexes.
21. **Lapshina D.A.** (*Ivanovo, Russia*)  
Boron(III) subphthalocyanines with carboxylic groups in the axial position and their impregnation on graphitic carbon nitride
22. **Lomova T.N.** (*Ivanovo, Russia*)  
Reactions of molybdenum(v) porphyrins with fullerene-containing bases and properties of the formed dyads

- 23. Louhina I.V.** (*Syktvykar, Russia*)  
Synthesis of hydrophilized dimeric derivatives of chlorin e6 and their interaction with layered magnesium silicate
- 24. Maiorova L.A.** (*Ivanovo, Russia*)  
Nanostructured monolayers and langmuir-schaefer films of cobalt phthalocyanine
- 25. Mozgova V.A.** (*Ivanovo, Russia*)  
The study of axial imidazole bearing ligands effects on the properties of chloro(octaethylporphinato) manganese(III) in the ground and excited state
- 26. Ning Li** (*Beijing, China*)  
Metal phthalocyanine frameworks for synergistic and efficient electrocatalytic C-N coupling
- 27. Novikov I.V.** (*Ivanovo, Russia*)  
Catalytic activity of a metal-organic framework depending on the medium temperature and the catalyst mole fraction
- 28. Palamar A.V.** (*Ivanovo, Russia*)  
Dye indocyanine green new: photophysical properties, aggregation in aqueous solution and carriers interactions
- 29. Pichuzhkin E.S.** (*Chernogolovka, Russia*)  
Development of new photosensitizers based on 1,4-diazepinotribenzoporphyrates: synthesis and investigation of photochemical properties
- 30. Pogonin A.E.** (*Ivanovo, Russia*)  
Molecular structure and spectra of some azo dyes based on phthalonitrile
- 31. Poletaeva U.V.** (*Ivanovo, Russia*)  
Interaction of 5,10,15,20-(tetra-N,N,N-trimethyl-4-aminophenyl)porphyrin and its zinc complex with bioactive macromolecules and quantum dots in aqueous media
- 32. Qingmei Xu** (*Beijing, China*)  
Bipolar-type covalent organic framework on carbon nanotubes with enhanced density of redox-active sites for high-performance lithium-ion batteries
- 33. Rocheva T.K.** (*Syktvykar, Russia*)  
Derivatives of protoporphyrin ix with fragments of ethanolamine and ethylenediamine
- 34. Shilov I.V.** (*Ivanovo, Russia*)  
Features of the synthesis of porphyrin-containing polymers in the presence of bis(trifluoromethylsulfonyl)imide ionic liquid

- 35. Tianyu Zheng** (*Beijing, China*)  
Nanostructurally Engineering Covalent Organic Frameworks for Boosting CO<sub>2</sub> Photoreduction
- 36. Vyalkin D.A.** (*Ivanovo, Russia*)  
Geometric and electronic structure of porphyrazine complexes Al(III), Ga(III), In(III) and their perhalogenated derivatives using dft and tddft methods
- 37. Xiaoning Zhan** (*Beijing, China*)  
General Design Strategy of Anti-aromatic Porphyrinoids
- 38. Xu Ding** (*Beijing, China*)  
Molecular modification of planar four-coordinated cobalt active site for the electrochemical reduction of carbon dioxide: a density functional theory study
- 39. Zaitseva S.V.** (*Ivanovo, Russia*)  
Synthesis and properties of  $\mu$ -nitrido- and  $\mu$ -carbidodimer heterometallic homometallic homo/heteroleptic macroheterocyclic complexes
- 40. Zamai G.S.** (*Krasnoyarsk, Russia*)  
Photodynamic therapy of cancer cells using a bacteriochlorin composition
- 41. Zhixin Liu** (*Beijing, China*)  
Unprecedented Planar-square SiO<sub>4</sub>-moiety Connected 2D Covalent Organic Frameworks for Anodic Potassium Ion Storage



