

UNIVERSITY OF PARDUBICE
Faculty of Chemical Technology
Institute of Energetic Materials
CZ-532 10 Pardubice
<http://www.ntrem.com>

PROGRAM

(the fourth version)

of the twenty second seminar

**„NEW TRENDS IN RESEARCH OF ENERGETIC
MATERIALS“**



NTREM 2019

held at the University of Pardubice

Pardubice, the Czech Republic

April 10th – 12th, 2019

*intended as a meeting of students, postgraduate students, university teachers and
young research and development workers, with interest in energetic materials*

22ND INTERNATIONAL SEMINAR
“NEW TRENDS IN RESEARCH OF ENERGETIC MATERIALS”
<http://www.ntrem.com>

is supported by:

Austin Detonator, Inc., Vsetín, Czech Republic
Office of Naval Research Global, Science & Technology, London
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Biazzi SA, Switzerland
OZM Research, Hrochův Týnec, Czech Republic
HiFire, Schaffler GmbH & Co KG
Nicolet CZ, Prague, Czech Republic
Faculty of Chemical Technology, University of Pardubice,

The twenty second consecutive seminar on new trends in research of energetic materials is intended to be a world meeting of *young* people, university teachers and specialists working in the fields of teaching, research, development, processing, analyzing and application of all kinds of energetic materials. The main focus of this year's meeting will be aimed towards **Synthesis and Formulation** but attention will also be devoted to other problems related to energetic materials. It is not aimed only at the exchange of professional information but also at creating a pleasant meeting where young specialists from different countries have the opportunity to meet and gain personal contacts.

Papers should not only describe research work itself, but should also demonstrate awareness of the context and background for the research.

The seminar is organized by staff members of the Institute of Energetic Materials University of Pardubice and in accordance with the tradition of previous meetings will take place at the University Hall.

The official language of the seminar is **English** and all contributions shall be presented and written exclusively in the English language.

Registration fee: € 200.- everyone, paid on spot.

Passports and visas: the visitors from most countries outside EU need valid passport and visa when entering CR. Please contact the Czech Embassy or consulate in your country for more information (CR is a part of Schengen territory).

Registration: registration of participants after this date will take place at the University Hall:

April 9 th	3:00PM - 6:00 PM	<u>with welcome snack at University Hall</u>
April 10 th	7:30AM - 10:00 AM	

Proceedings of the presented contributions will be prepared by the organizers of the seminar by the date of its opening; price of the proceedings will be 3500.- CZK (i. e. ~ \$180; €140) printed version and 500.- CZK (i. e. ~\$ 25, € 20) CD version – the prices are valid at the time of the seminar. The Proceedings will be provided to the main authors free of charge.

Please, watch the web site <http://www.ntrem.com> for updates

Chairman of the Seminar:

Prof. Svatopluk Zeman

University of Pardubice, Czech Republic

Chairman of the Scientific Committee:

Prof. Adam Cumming

University of Edinburgh, United Kingdom.

Members of the Scientific Committee:

Assoc. Prof. Alexandr Astachov	<i>Reshetnev Siberian State University of Science and Technology, Russia</i>
Dr. Manfred A. Bohn	<i>Fraunhofer ICT, Pfinztal, Germany</i>
Prof. José A. Campos	<i>University of Coimbra, Portugal</i>
Dr. David Chavez	<i>Los Alamos National Laboratory, NM, USA</i>
Dr. Ruth Doherty	<i>Energetic Technology Center, Indian Head, Maryland, USA</i>
Prof. Michael Gozin	<i>University of Tel Aviv, Israel</i>
Prof. Mikhail Ilyushin	<i>State Institute of Technology, Saint-Petersburg, Russia</i>
Prof. Thomas Klapoetke	<i>Ludwig-Maximilians-Universität München, Germany</i>
Prof. Pavel Konečný	<i>University of Defence, Brno, Czech Republic</i>
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Prof. Andrzej Paplinski	<i>Military University of Technology, Warsaw, Poland</i>
Prof. Vladimir Petrov	<i>Kazan National Research Technological University, Russia</i>
Prof. Tatiana S. Pivina	<i>Zelinskii Inst. of Organic Chemistry, Moscow, Russia</i>
Dr. William Proud	<i>Imperial College London, United Kingdom</i>
Prof. Karl Rink	<i>University of Idaho, USA</i>
Prof. Traian Rotariu	<i>Military Technical Academy, Bucharest, Romania</i>
Prof. Ruiqi Shen	<i>Nanjing University of Science and Technology, China</i>
Prof. Valery Sinditskii	<i>Mendeleev University of Chem. Technology, Moscow, Russia</i>
Prof. Aleksander Smirnov	<i>Bakhirev State Sci. Res. Inst. of Mechan. Eng. Dzerzhinsk, Russia</i>
Prof. Muhamed Sućeska	<i>University of Zagreb, Zagreb, Croatia</i>
Prof. Waldemar A. Trzciński	<i>Military University Technol., Warsaw, Poland</i>
Prof. Abbaraju Venkataraman	<i>Gulbarga University, Kalaburagi, India</i>
Dr. Clive Woodley	<i>Imperial College London, United Kingdom</i>
Prof. Vladimir Zarko	<i>Institute of Chem. Kinetics & Combustion RAS, Novosibirsk, Russia</i>
Prof. Svatopluk Zeman	<i>University of Pardubice, Czech Republic</i>
Prof. Chaoyang Zhang	<i>Inst. Chem. Materials, CAEP, Mian Yang, China</i>
Prof. Jianguo Zhang	<i>Beijing Inst. of Technology, Beijing, China</i>

Organizing Committee

Chairman of the Committee:

Assoc. Prof. Jiří Pachman

IEM, FCT, University of Pardubice, CR

Members of the Committee:

Dr. Jakub Šelešovský

IEM, FCT, University of Pardubice, CR

Dr. Marcela Jungová

IEM, FCT, University of Pardubice, CR

Dr. Iva Ulbrichová

Dean Office, FCT, University of Pardubice

Organizing committee of NTREM

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Affiliated activities:

The first meeting of the *SCIENTIFIC COMMITTEE* will be carried out on Tuesday, **April 9th, 2019**, at 6 p.m. in **Bonté** (*across the street from Atrium Palace*) the second one on Thursday, **April 11th, 2019**, at 16:30 in the University Hall – see page 7.

A friendly get-together for NTREM participants will be arranged at **the Congress Centre in the Atrium Palace of Pardubice** (former AFI Palace on page 19) on April 11th, 2019 meeting at 18:30.

Lecture program of the 22nd NTREM – Wednesday April 10th

08:10 **Meeting of all speakers** of the first Session with Chairman of this Session.

08:20 **Opening of seminar** – speech of *vice-dean of FCT, Prof. Libor Čapek*

08:40 **Organizing Committee notes** - Assoc. Prof. Jiri Pachman

1. Session

Chairman: Dr. Ruth Doherty
Energetic Technologic Center, Indian Head, Maryland, USA

08:50 **Jesse Sabatini**, Eric Johnson, Eric Bukowski *invited lecture*
US Army Res. Laboratory, Aberdeen Proving Ground, Maryland, USA Proving Ground, Maryland, USA
Synthesis of melt-castable explosive and propellant plasticizing materials.

09:20 **Maximilian H. H. Wurzenberger**, Thomas M. Klapötke, Marcus Lommel
Ludwig-Maximilian University of Munich, Munich, Germany
New ligands and energetic coordination compounds for use as primary and laser ignitable explosives.

09:40 **Leonid Fershtat**, Alexander Larin, Nikita Muravyev, Dmitry Khakimov, Ivan Ananyev, Nina Makhova
Russian Academy of Sciences, Zelinsky Institute of Organic Chemistry, Moscow, Russia
New family of energetic salts incorporating tetrazolylfuroxan core.

10:00 **Stefan Ek**, Jonas Johansson, Mona Brantlind, Hanna Ellis, Martin Skarstind
The Swedish Defence Research Agency (FOI), Norra Sorunda, Sweden
Synthesis and characterisation of tri- and tetraethyleneglycoldiazide for their use as energetic plasticisers.

10:20 – 10:40 Coffee break

10:40 **Ivan Gospodinov**, Thomas M. Klapötke, Kostiantyn Domasevitch, Jörg Stierstorfer
Ludwig-Maximilian University of Munich, Munich, Germany
4,4'-Bipyrazole as a building block for new energetic materials.

11:00 **Lukasz Gutowski**, Mateusz Szala, Konrad Skrobisz
Military University of Technology, Warsaw, Poland
Nitro derivatives of benzo[c]cinnoline-5-oxide as new energetic compounds.

11:20 **Yao Du**, Shenghua Li, Siping Pang
Beijing Institute of Technology, Beijing, China
Study on the structure-property relationship of energetic metal-organic frameworks: A guide to the development of high energetic materials.

11:40 **Alicia M. W. Dufter**, Thomas M. Klapötke, Magdalena Rusan, Jörg Stierstorfer
Ludwig-Maximilian University of Munich, Munich, Germany
Lithium dihydrobis(azoly)borates as colorants for strontium- and chlorine-free red pyrotechnics.

12:00 - 14:00 LUNCH BREAK

Lecture program of the 22nd NTREM - Wednesday April 10th

2. Session

Chairman: Prof. Tatyana S. Pivina
Zelinskii Inst. of Organic Chemistry, Moscow

13:50 **Meeting of all speakers** of the second Session with Chairman of this Session.

14:00 **Judyta Rećko**, Rafał Lewczuk, Leszek Szymańczyk, Svatopluk Zeman
Military University of Technology, Warsaw, Poland
Study on explosive properties of BCHMX.

14:20 **Jifeng Chen**, Yuchuan Li, Siping Pang
Beijing Institute of Technology, Beijing, China
Combination high energy with stability: polynitrogen explosives N14 and N18.

14:40 **Nilgün Sen**, Colin Pulham
University of Edinburgh, Edinburgh, United Kingdom
Crystal engineering of energetic materials: Co-crystal of 2,4,6-trinitrophenol with modified performance and improved sensitivity

15:20 **Romuald Van Riet**, Peter Lodewyckx, Conchi O. Ania, Michel H. Lefebvre
Department of Chemistry, Royal Military Academy, Brussels, Belgium
A novel energetic nanomaterial based on nanoporous carbons.

15:40 **Xing-long Li**, Wei Cao, Qing-guan Song, Da-yuan Gao, Chao-yang Zhang, Feng Zhao, Yuan-ping Zhang, Shang-gang Wen, Bao-hui Zheng, Xiang-li Guo
Institute of Chemical Material, China Academy of Engineering Physics, Mianyang City, China
Experimental study and numerical simulation of explosives containing B/Al in underwater explosions.



Prof. Manfred Held presents his lecture on April 2007 (the 10th NTREM) under the Session chairmanship by Dr. Scott A. Shackelford from the Edwards AFB, USA.

Lecture program of the 22nd NTREM – Thursday April 11th

3. Session

Chairman: Prof. Karl Rink
University of Idaho, USA

08:00 **Meeting of all speakers** of the third Session with Chairman of this Session

08:20 **Michael Gozin** *invited lecture*
Tel Aviv University, Tel Aviv, Israel

Development of promoters for hypergolic reactions.

08:50 **Marcin Hara**, Waldemar Trzciński, Stanisław Cudziło, Zbigniew Chyłek, Mateusz Szala, Zbigniew Surma
Military University of Technology, Warsaw, Poland

Studies of the ballistic parameters of new complex propellants.

09:10 **Yaru Li**, Hanjian Li, Hui Ren, Jie Liu
Beijing Institute of Technology, Beijing, China

Electrospinning preparation of micro/nanoscale-Al/MoO₃ thermite fibers with enhanced combustion performances through incorporating nano-carbon materials.

09:30 **Barbara Štimac**, Martin Künzel, Muhamed Sućeska, Siniša Stanković
University of Zagreb, Faculty of Mining, Geology, and Petroleum Engineering, Zagreb, Croatia

Detonation reaction zone in nitromethane: Experimental and numerical studies.

09:50 **Olivia J. Morley**, David M. Williamson
University of Cambridge, Cambridge, United Kingdom

Influence of reaction rate on optical emission spectra of HMX.

10:10 – 10:30 Coffee break

10:30 **Hui Su**, Shenghua Li, Siping Pang
Beijing Institute of Technology, Beijing, China

Design and fabrication of aluminum-free energetic thermites films with high activity, energy density and stability.

10:50 **Mikhail Zharkov**, Oleg Dobrynin, Ilya Kuchurov, Nikita Muravyev, Alla Pivkina, Sergey Zlotin
N. D. Zelinsky Institute of Organic Chemistry, Russian Academy of Sciences, Moscow, Russia

Phlegmatization of energetic materials with polymer films in supercritical conditions.

11:10 **Honglei Zhang**, Qingjie Jiao, Xueyong Guo, Huaiyu Jiang
Beijing Institute of Technology, Beijing, China

Research on performance of CL-20 based explosives with different binder systems.

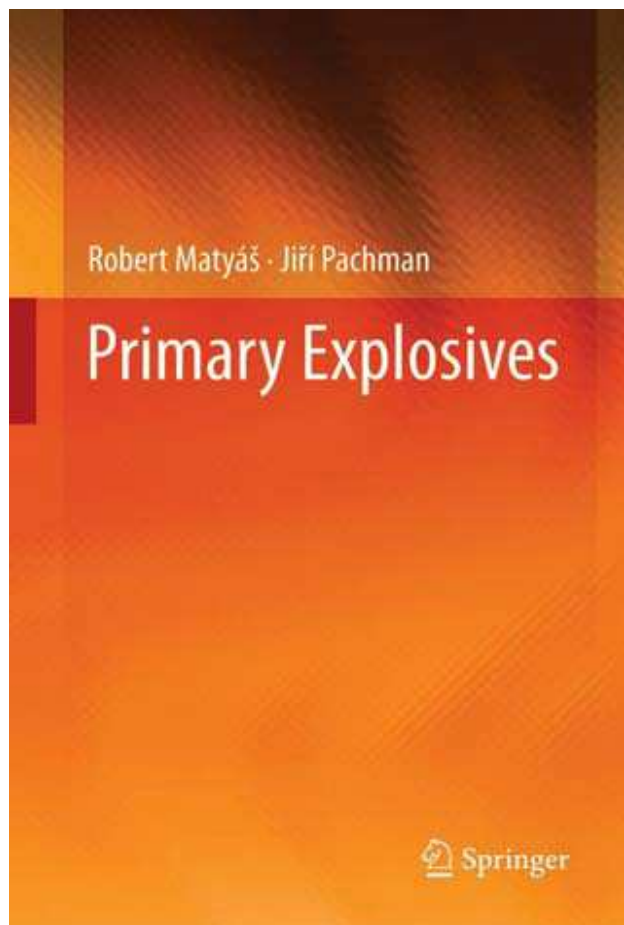
11:30 PHOTOGRAPHY in University Hall

12:00 - 14:00 LUNCH BREAK

4. Session – Poster program – see on page 12

16:30 The second meeting of Scientific Committee (*University Hall*)

A book advertising



R. Matyáš, and J. Pachmáň,
Primary Explosives, Springer, Heidelberg 2012,
ISBN 978-3-642-28435-9, €106.95



Participants of the 21th Seminar NTREM in the University Hall on April 19th, 2018



Dr. Qi-long YAN from the Northwestern Polytechnical Univ. in Xi'an presents his lecture on April 18th, 2018



The best lectures at the 21st NTREM (2018):
Mr. Qi-Long YAN (NPU, Xi'an, China)
Ms. Alicia M. W. Dufter (LMU, Munich, Germany)
Mr. Mikhail Zharkov (RAS, Moscow, Russia)



The best posters at the 21st NTREM (2018):
Mr. Mauricio F. Lemos (BNRI, Rio de Janeiro, Brazil)
Mr. Anton Zverev (KSU, Kemerovo, Russia)
Mr. Vladimir A. Sizov (MUCT, Moscow, Russia)

Lecture program of the 22nd NTREM – Friday April 12th

5. Session

Chairman: Prof. Adam Cumming
University Edinburgh, United Kingdom

- 08:40 **David Lempert**, Ekaterina Dorofeenko, Alexei B. Sheremetev
Russian Academy of Science, Chernogolovka, Russia
Dependence of the specific impulse of solid composite propellants basing on oxidizers with NF₂-groups on aluminum content in the formulation.
- 09:00 **Mitja Vahcic**, Grzegorz Rarata, David Anderson
Joint Research Centre, Geel, Belgium
Development of inert simulants for high explosives at the JRC Geel – problems and perspectives.
- 09:20 **Qu Yanyang**
China Academy of Engineering Physics, Mianyang, China
Study on the synthesis and properties of the initiation explosives for applications in impact detonator.
- 09:40 **Katsumi Katoh**, Akihiro Torigoe, Seiji Nishida
Fukuoka Univ., Fukuoka, Japan
Preparation and dismantlability evaluation of urethane acrylate resin containing inorganic salts.
- 10:00 **Valentina Mochalova**, Alexander Utkin, Alexander M. Astachov, Sergey Torunov, Viktoriya Rykova
Institute of Problems of Chemical Physics RAS, Chernogolovka, Russia
Investigation of detonation properties of tetranitromethane/methanol mixture.
- 10:20 – 10:40 Coffee break**
- 10:40 Stephanie Aguero, Charlotte Alliod, Roland Denis, Guy Jacob, **Raphaël Terreux**
Institute for the Biology and Chemistry of Proteins, Lyon, France
Prediction of high energy molecules properties using recursive molecular search (R.Mo.S).
- 11:00 Daniel C. Elton, Dhruv Turakhia, Nischal Reddy, **Zois Boukouvalas**, Ruth M. Doherty, Mark D. Fuge, Peter W. Chung
University of Maryland, College Park, College Park, Maryland, USA
Using natural language processing techniques to extract information on the properties and functionalities of energetic materials from large text corpora.
- 11:20 **Victor Zakharov**, Nikita Chukanov, Gennadii Shilov, George Malkov, Alexei Shastin, Boris Korsunskiy
Russian Academy of Science, Chernogolovka, Russia
Kinetic and thermochemical studies of 2,4-bis(dimethylamino)-6-trinitromethyl-1,3,5-triazine.
- 11:40 **Manfred A. Bohn**, Maurício Ferrapontoff Lemos
Fraunhofer Institut für Chemische Technologie (ICT), Pfinztal, Germany
Characterizing of glass-rubber transition shift in filled HTPB-IPDI formulations by modified and normal Arrhenius equation.

12:00 – 13:00 CLOSING REMARKS including AWARDING OF PRIZES

Poster program of the 22nd NTREM – Thursday April 11th

6. Session

Chairman: Prof. Svatopluk Zeman
University of Pardubice

Posters should be hung on **Wednesday, April 10th**, before 14:00. Special poster sessions will take place on **Thursday (April 11th)** from 14:00 up to 16:30 h. During this time authors should be present for discussion at the posters.

- P.1** Martin Künzel, Ondřej Vodochodský, Jiří Pachmáň
University of Pardubice, Pardubice
Simultaneous measurement of detonation velocity & detonation front curvature using fiber optic probe.
- P.2** Joana Quaresma, Lukas Deimling, Ricardo Mendes, Jose Campos
LEDAP – Laboratório Energética e Detónica, University of Coimbra, Coimbra, Portugal
Optical fiber metrology for detonation velocity measurements.
- P.3** Jindřich Kučera, Karel Kubát, Aline. C. Anastacio, Martin Künzel, Jakub Šelešovský, Jiří Pachman
University of Pardubice, Pardubice
Planarity of shock wave from explosive plane wave generator.
- P.4** Ovidiu Iorga, Tudor-Viorel Tigianescu, Cristiana Epure, Alina-Nicoleta Dascalu, Gabriel Iosif
Scientific Research Center for CBRN Defense and Ecology, Bucharest, Romania
Blast effect and thermal measurements of thermobaric explosions in open terrain and enclosures.
- P.5** Yuan-ping Zhang, Shang-gang Wen, Qing-guan Song, Bao-hui Zheng, Wei Cao, Xing-long Li, Da-yuan Gao, Feng Zhao
Institute of Chemical Material, China Academy of Engineering Physics, Mianyang City, China
Experimental study and numerical simulation of explosives containing B/Al in underwater explosions.
- P.6** Yuan Li
Tsinghua University, Beijing, China
Fragment velocity formula for reverse detonation driving in opposite initiation.
- P.7** Qian Zhao, Zhenhua Lv, Bo Chang
Tsinghua University, Beijing, China
Mechanical response of multi-layer corrugated structure to blast loading.
- P.8** Jaroslav Schuster, Vojtěch Pelikán, Jakub Selesovsky
University of Pardubice, Pardubice
The new promising test procedure suitable for the energetic materials sensitivity testing.
- P.9** Michael S. Gruhne, Thomas M. Klapötke, Marcus Lommel, Maximilian H. H. Wurzenberger, Norbert Szimhardt, Jörg Stierstorfer
Ludwig-Maximilian University of Munich, Munich, Germany
Impact sensitivities of explosives explored by the OZM ball drop tester (BIT-132).
- P.10** Martin Zahálka, Vojtěch Pelikán, Robert Matyáš
University of Pardubice, Pardubice
Investigation of electrostatic discharge sensitiveness of 4,6-dinitrobenzofuroxane complexes (with selected monovalent metals).
- P.11** Jiří Tůma, Jan Zigmund
Research Institute for Industrial Chemistry, Explosia Co., Pardubice
Special theory of gradual ignition.
- P.12** Vladimír K. Golubev, Martin Künzel
University of Pardubice, Pardubice
Solving the problems of detonation and combustion of different energetic materials using the Explo5 program.

- P.13** Igor Liskov, Boris Aduiev, Andrey Nikitin, Anton Zverev, Natalya Ilyakova
Institute of Coal Chemistry and Material Science FRC CCC SB RAS, Kemerovo, Russia
Electron beam, as a means of direct initiation of energetic materials.
- P.14** Alexander M. Astachov, Denis V. Antishin, Valery O. Tamashkov
Reshetnev Siberian State University of Science and Technology, Krasnoyarsk, Russia
On the calculated detonation parameters of some oxygen-free explosives.
- P.15** Evgeny Petrov
Biysk Technological Institute (branch) of the Altay State Technical University, Biysk, Russia
Achievements and actual tasks of the development of detonation synthesis of nanodiamonds.
- P.16** Alexander M. Astachov, Denis V. Antishin, Andrew A. Nefedov, Eduard S. Buka
Reshetnev Siberian State University of Science and Technology, Krasnoyarsk, Russia
Reaction of S,S'-dimethyl-N-nitroimidodithiocarbonate with 3,5-diamino-1,2,4-triazole.
- P.17** Olga Nagornova, Zuhra Akhtyamova, Lyailya Nurullina, Ruslan Gilmanov
Kazan National Research Technological University, Kazan, Russia
Synthesis and properties of new derivatives of nitroimidazole.
- P.18** Elena Reinhardt, Marc Boelter, Thomas M. Klapötke
Ludwig-Maximilian University of Munich, Munich, Germany
New mixed heterocycles combining pyrazoles and tetrazoles.
- P.19** Hao Gu, Qing Ma, Guangbin Chen, Hongwei Yang, Guijuan Fan
Nanjing University of Science and Technology, Nanjing, China
Synthesis of a new energetic metal-organic framework based on Gem-dinitromethyl substituted 1,2,3-triazole.
- P.20** Marcus Lommel, Thomas M. Klapötke, Maximilian H. H. Wurzenberger, Michael S. Gruhne, Jörg Stierstorfer
Ludwig-Maximilian University of Munich, Munich, Germany
Preparation and characterization of energetic nitrotetrazolate-1N-oxides.
- P.21** Yuanguang Xu, Ming Lu, Yuanguang Xu
Nanjing University of Science and Technology, Nanjing, China
Potassium 5-(dinitromethyl)tetrazolate: a green energetic 3D metal-organic framework (MOF) as a primary explosive with high thermal stability.
- P.22** Cornelia C. Unger, Thomas M. Klapötke, Burkhard Krumm
Ludwig-Maximilian University of Munich, Munich, Germany
Azoles with trinitroalkyl substitution.
- P.23** Agata Olszewska, Janusz Szklarzewicz,
Jagiellonian University, Kraków, Poland
Research on the novel group of explosive d-block metal complexes with tetrazoles – syntheses and properties.
- P.24** David Lempert, Anatoli Kazakov, Anatoli Korepin, Vera Kosilko, Albina Nabatova, Natalia Glusha
Russian Academy of Science, Chernogolovka, Russia
New 2,2,2-trinitroethylamino- and 2,2,2-trinitroethylnitramino-derivatives of azidotriazines. Synthesis, thermochemical properties and energetic potential.
- P.25** Yupeng Cao, Xiangyang Lin
Nanjing University of Science and Technology, Nanjing, China
5,5'-Dinitramino-3,3'-bi(1,2,4-oxadiazole) and its energetic salts -a series of energetic materials with good performance.
- P.26** Huaiyu Jiang, Qingjie Jiao, Huaiyu Jiang
Beijing Institute of Technology, Beijing, China
Early events when heating 5,5'-bis(2,4,6-trinitrophenyl)-2,2-bi(1,3,4-oxadiazole): Self-consistent charge densityfunctional tight-binding molecular dynamics simulations.

- P.27** Max Born, Michael Voggenreiter, Thomas M. Klapötke, Konstantin Karaghiosoff
Ludwig-Maximilian University of Munich, Munich, Germany
New energetic oxetane monomers based on nitroaromatic scaffolds.
- P.28** Jian Zhang, Yifei Ling, Guixiang Wang, Lin Zhang, Jun Luo
Nanjing University of Science and Technology, Nanjing, China
Synthesis of two new gem-fluoronitro contained tetranitroadamantanes and property comparison with their nitro and gem-dinitro analogues.
- P.29** Maxim Topchiy, Vladimir Sizov, Sergey Rzhavskiy, Andrey Asachenko, Mikhail Nechaev, Dmitriy Pleshakov
Mendeleev University of Chemical Technology, Moscow, Russia
Physicochemical properties of 2,2-dinitro-1,3-bis-nitrooxy-propane.
- P.30** Chao Yan, Hongwei Yang, Guangbin Cheng, Qinghua Zhang
Nanjing University of Science and Technology, Nanjing, China
A novel derivatization strategy for FOX-7.
- P.31** Yu Zhang
Nanjing University of Science and Technology, Nanjing, China
A stepwise strategy for the synthesis of HMX from 3,7-dipropionyl-1,3,5,7-tetraazabicyclo[3.3.1]nonane.
- P.32** Valery Nikitin, Ruslan Gilmanov, Farid Khairutdinov, Nazya Khairullina
Kazan National Research Technological University, Kazan, Russia
The new ways of 4-nitrofurazanilpropanoic acid synthesis.
- P.33** Jonas Šarlauskas, Jelena Tamulienė
Institute of Biochemistry, Life Sciences Center, Vilnius University, Vilnius, Lithuania
Preparation and characterization of energetic salts of 5-amino-PATO (AmPATO).
- P.34** Radovan Skácel, Jan Frys, Markéta Zikmundová
Research Institute for Industrial Chemistry, Explosia Co., Pardubice
Reduced sensitivity RDX, HMX and PETN crystallized from propylene carbonate in a presence of stearic acid.
- P.35** Yuriy Mikhailov, Ludmila Romanova, Anna Darovskikh, Alexander Tarasov
Institute of Problems of Chemical Physics, Russian Academy of Science, Chernogolovka, Russia
Inclusion complexes of cyclodextrin nitrates with compounds containing explosive groups in their composition.
- P.36** Dominik E. Dosch, Thomas M. Klapötke, Konstantin Karaghiosoff,
Ludwig-Maximilian University of Munich, Munich, Germany
Investigation of the molecular and crystal structure of two 2,4,6-trinitrobenzene derivatives.
- P.37** Anne Dhenain, Carlos Miro Sabate, Duc Minh Le, Paul Ducos, Nicolas Pelletier, Emmanuel Lacôte, Guy Jacob
Hydrazines & Polynitrogen Energetic Compounds, Ariane Group, Villeurbanne, France
Strategy for the design of new ionic liquids to replace hydrazines in rocket propulsion.
- P.38** Tatjana S. Konkova, Yuriy N. Matyushin, Evgeniy A. Miroshnichenko, Jaroslav O. Inozemtsev, Irina B. Vyunova
Semenov Institute of Chemical Physics, Russian Academy of Sciences, Moscow, Russia
The thermochemical properties of nitrourea and its salts.
- P.39** Evgeniy A. Miroshnichenko, Yuriy N. Matyushin, Tatjana S. Konkova, Larisa L. Pashchenko, Aleksei B. Vorob'ev, Aleksei V. Inozemtsev
Semenov Institute of Chemical Physics, Russian Academy of Sciences, Moscow, Russia
**Cyclic and frame hydrocarbons - the energy of reorganization of the radicals.
Physico-chemical properties and combustion behavior of new oxygen-rich pyrazolytetrazoles.**
- P.40** Maurício Ferrapontoff Lemos, Luis Claudio Mendes, Manfred A. Bohn
Instituto de Pesquisas da Marinha - IPqM, Rio de Janeiro, Brazil
Octyl-1-azide as modifier of HTPB.

- P.41** Timur Mukhametshin, Nina Kuznetsova, Vladimir Petrov, Anatoly Kostochko, Rail Sharipov, Dmitry Vinogradov, Pavel Bulatov
Kazan National Research Technological University, Kazan, Russia
Copolymerization of nitratomethyl and azidomethyl substituted oxetanes: the morphology of statistical block copolymers.
- P.42** Mikhail A. Ilyushin, Aleksandr P. Vozniakovskii, Irina V. Shugalei, Olga P. Shustrova, Anatoly S. Kozlov, Georgii G. Savenkov,
Saint – Petersburg State Institute of Technology (Technical University), Saint-Petersburg, Russia
Mixtures of pentaammine (5-nitrotetrazolato – N₂) cobalt (III) perchlorate and nanocarbon.
- P.43** Hualin Xiong, Guangbin Cheng, Hongwei Yang
Nanjing University of Science and Technology, Nanjing, China
A promising energetic compound with excellent detonation performance and low sensitivity.
- P.44** Natalia Averianova, Vladimir Petrov, Marat Gibadullin
Kazan National Research Technological University, Kazan, Russia
Assessment of influence of high-intensity mechanical treatment on the properties of cellulose nitrate.
- P.45** Katarzyna Gańczyk-Specjalska, Katarzyna Drożdżewska, Katarzyna Cieślak
Institute of Industrial Organic Chemistry, Warsaw, Poland
Physico-chemical properties of nitrocellulose granular with different nitrogen content.
- P.46** Zimfira Valishina, Aidar Saetshin, Evgeny Matukhin, Razina Khakimzyanova, Anatoly Kostochko
Kazan National Research Technological University, Kazan, Russia
Modernization of the grinding technology and quality evaluation method cellulose nitrates.
- P.47** Tudor-Viorel Tiganescu, Ovidiu Iorga, Zoran Constantinescu, Raluca-Elena Ginghina
Military Tehnical Academy, Bucharest, Romania
Formulations of different fuel grains for hybrid rocket motor system.
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Fraunhofer Institut für Chemische Technologie (ICT), Pfinztal, Germany
Continuous microfluidic process for formation of ADN-prills.
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Agency for Defense Development, Daejeon, South Korea
Ethoxy-2,4,6-trinitrobenzene(ETNB), a new candidate for melt-cast explosives.
- P.50** Mingu Han, Keundeuk Lee, Ha-neul Park, Jooseung Chae, Kibong Lee, Jungsu Park,
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- P.53** Liudmila Krugliakova, Rudolf Stepanov, Oksana Golubtsova,
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Comparative study on reaction characteristics of micron-sized aluminum and nano-sized aluminum in O₂ and CO₂ environment.
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- P.64** David Lempert, Anatoli Kazakov, Leonid Yanovskiy
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Potential capability of some ethynyl derivatives as fuel dispersants for solid fuel ducted rockets.
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- P.68** Teodora Zecheru, Traian Rotariu
Military Technical Academy "Ferdinand I", Bucharest, Romania
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- P.69** Petar Shishkov, Nadezhda Stoycheva
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Institute of Chemical Material, China Academy of Engineering Physics, Mianyang City, China
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Influence of ballistic modifiers on the combustion wave of low-calorie propellant.



*Meeting of the Scientific Committee and representatives of sponsors
of the 21st Seminar NTREM on April 17th, 2018*

Evening's program of the 22nd NTREM – Thursday April 11th

18:30 - 22:00

EVENING PROGRAM -A friendly get-together in the Congress Centre in Atrium Palace

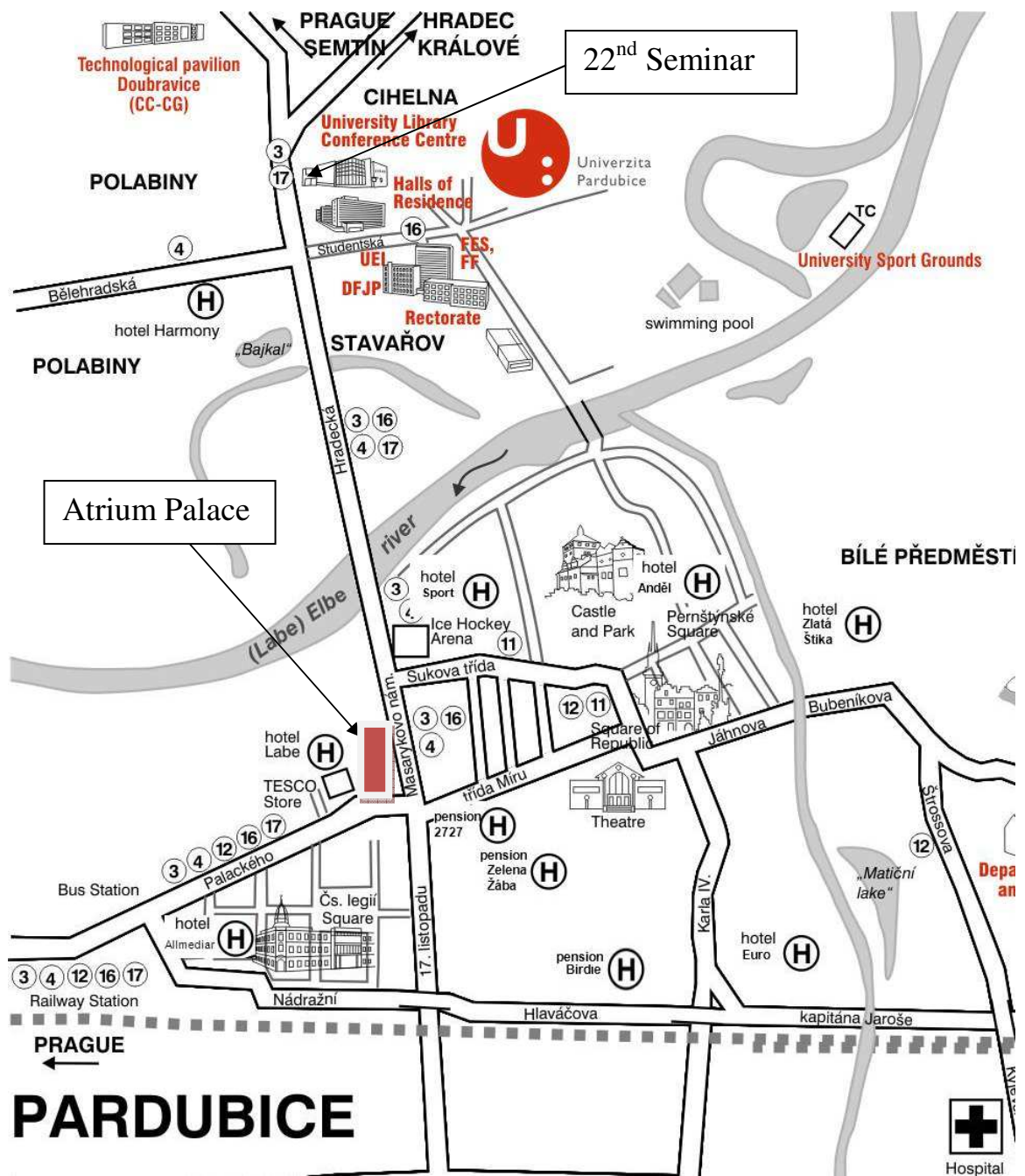


The **Atrium Palace** of Pardubice (former AFI Palace) is finding in the town center on the main crossing in Pardubice (on the Masaryk square)



Masaryk square – Atrium Palace is on the left side

22nd SEMINAR - orientation map – town PARDUBICE



The old town Pardubice – Pershtein square