

Program of the 14th Seminar on

New Trends in Research of Energetic Materials



Pardubice, April 13–15, 2011

University of Pardubice, Faculty of Chemical Technology
Institute of Energetic Materials

supported by



NTREM '11

Program of Seminar on New Trends in Research of Energetic Materials

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Organizer

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The fourteenth consecutive seminar on new trends in research of energetic materials is intended to be a world meeting of young people and university teachers working in the fields of teaching, research, development, processing, analyzing and application of all kinds of energetic materials. This seminar also covers explosions in gaseous, dispersed and condensed systems. 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 papers presented at this meeting will be quoted in the **Chemical Abstracts**.

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: *Students and young researchers* free of charge, *other* free of charge, voluntary donation of €100 to help co-sponsor the seminar would be greatly appreciated. The evening program at Pardubice's Castle (Thursday, April 14, see page 6) is paid (€10), payment during registration.

Passports and visas: The visitors from most countries outside EU need valid passport and visa when entering Czech Republic. Please contact the Czech Embassy or consulate in your country for more information (Czech Republic is a part of Schengen territory from January 1, 2008).

Registration: Via web form should be done before the end of April 11, 2011. Registration of participants after this date will take place at the University Hall:

April 12, 4:00PM–7:00 PM
April 13, 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 CZK 3500 (i.e. €145, \$205) printed version and CZK 600 (i.e. €25, \$35) CD version with printed abstracts—the prices are valid at the time of the seminar. The Proceedings will be provided to the main authors free of charge.

14th Seminar of the New Trends in Research of Energetic Materials

Chairman of the Seminar:

Prof. Svatopluk Zeman, D.Sc. *IEM, FCT, University of Pardubice, CR*

Scientific Committee:

Chairman

Dr. Adam Cumming *DSTL, Sevenoaks, UK*

Cochairman

Prof. Stanislaw Cudzilo *Military University of Technology, Warsaw, Poland*

Member

Prof. Ronald Armstrong *University of Maryland, College Park, Maryland, USA*

Prof. Alexandr Astachov *Siberian State Technological University, Russia*

Dr. Ruth Doherty *Department of Homeland Security, Washington, USA*

Prof. Zdeněk Friedl *Brno University of Technology, Brno, Czech Republic*

Prof. Manfred Held † *HemaconsultingGmbH, Schrobenhausen, Germany*

Prof. Thomas M. Klapötke *Ludwig Maximilians Universität, München, Germany*

Prof. Kee-Kahb Koo *Sogang University, Seoul, Korea*

Prof. Michel Lefebvre *Royal Military Academy, Belgium*

Dr. Carl-Otto Leiber *Rheinbach, Germany*

Dr. David Lempert *Russian Academy of Science, Chernogolovka, Russia*

Prof. František Ludvík *University of Defence, Brno, Czech Republic*

Prof. Andrzej Maranda *Military University of Technology, Warsaw, Poland*

Prof. Hans J. Pasman *Texas A&M University, College Station, Texas, USA*

Prof. Tatiyana S. Pivina *Zelinskii Institute of Organic Chemistry, Moscow, Russia*

Dr. Igor Plaksin *ADAI & LEDAP, University of Coimbra, Portugal*

Dr. William G. Proud *Imperial College London, UK*

Prof. Yuan-Jie Shu *Chinese Academy of Engineering Physics, Mian Yang, China*

Prof. Valerii P. Sinditskii *Mendeleev University of Chemical Technology, Moscow*

Prof. Waldemar Trzciński *Military University of Technology, Warsaw, Poland*

Prof. Lemi Türker *Middle East Technical University, Ankara, Turkey*

Assoc. Prof. Pavel Vávra *IEM, FCT, University of Pardubice, Czech Republic*

Dr. Woodward Waesche *SAIC, Gainesville, USA*

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Chairman

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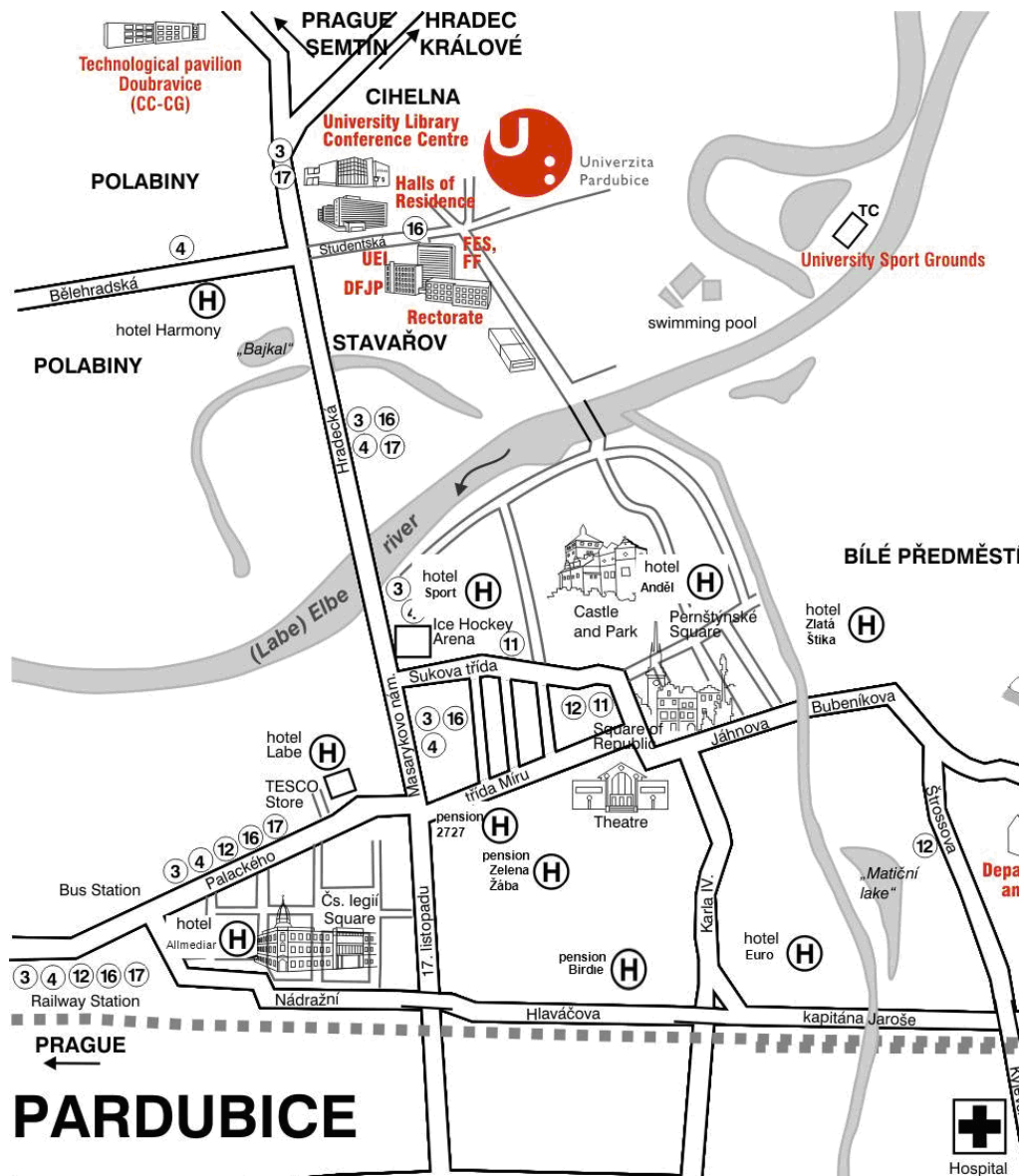
Dr. Iva Ulbrichová *Dean office, FCT, University of Pardubice, Czech Republic*

The first meeting of the SCIENTIFIC COMMITTEE will be carried out on Tuesday, April 12, at 6 p.m. in the Pension & Restaurant BIRDIE (see map at page 2), the second one on Thursday, April 14.

16:00–19:00 Registration

19:00–21:00 Scientific Committee meeting

Plan of Pardubice



07:30 Participant registration

08:40–09:00 Opening note by Tatiana Molkova, vice-rector of University of Pardubice

First Session Chair: Ruth Doherty (Dept. of Homeland Security, Washington, USA)

08:15 Meeting of first session speakers with chairman

09:00 **Nina Makhova** (*invited lecture*)

Zelinsky Institute of Organic Chemistry Russian Academy of Sciences , Moscow, Russia
Synthesis and reactivity of amino and nitrofuraxans

09:30 **Stefan Ek**, Larisa Yudina Wahlstrom, Nikolaj Latypov
Swedish Defence Research Institute (FOI) , Tumba, Sweden

Derivatives of 3(5),4-dinitropyrazole as potential energetic plasticisers

09:50 Michael Göbel, Konstantin Karaghiosoff, Thomas M. Klapötke, **Davin G. Piercey**, Jörg Stierstorfer

Ludwig-Maximilian University of Munich , Munich, Germany

Energetic salts and chemistry of the nitrotetrazolate-2N-oxide anion

10:10 **Niko Fischer**, Thomas M. Klapötke, Jörg Stierstorfer

Ludwig-Maximilian University of Munich , Munich, Germany

The hydroxylammonium cation in tetrazole based energetic materials

10:30–10:50 Coffee break

10:50 **Alexey Kvasov**, Vladimir Zarko, Alexey Ancharov, Konstantin Kuper

Institute of Chemical Kinetics and Combustion, Siberian Branch of the Russian Academy of Sciences , Novosibirsk, Russia

Physicochemical properties of condensed systems based on 5,6-(3',4'-furasano)-1,2,3,4-tetrasine-1,3-dioxide

11:10 **David Millar**, David Allan, Laura Cocker, Adam Cumming, Craig Henderson, Alexandra Mackay, Helen Maynard-Casely, Anna Muszkiewicz, Iain Oswald, Colin R. Pulham
University of Edinburgh , Edinburgh, United Kingdom

Co-crystallisation of energetic materials: a step towards tailored munitions?

11:30 **Selcuk Gumus**, Taner Atalar

Yuzuncu Yil University, Department of Chemistry , Van, Turkey

Computational study on all possible diamino-dinitropyrimidines and their mono and dioxide derivatives

11:50 **Andrey V. Len'**, Sergey I. Gerasimov, Mikhail A. Ilyushin

Russian Federal Nuclear Centre , Sarov, Russia

Ignition of light-sensitive compositions with explosive thermochemical sources

12:10 **Sergey I. Gerasimov**, Andrey V. Len', Mikhail A. Ilyushin, Petr N. Kalmykov

Russian Federal Nuclear Centre , Sarov, Russia

Definition of diversity for ignition of light-sensitive pyrotechnic composition pellets with roentgraph method

12:30–14:00 Lunch

Second Session Chair: Michel Lefebvre (Royal Military Academy, Belgium)

- 13:40–14:00 Meeting of second session speakers with chairman
- 14:00 **Joseph E. Backofen** (*invited lecture*)
BRIGS Co. , Moneta, Virginia, USA
The two-stage detonation propulsion model: exploring its intriguing trend-lines and equations
- 14:30 **Michael P. Messner**, Florian Bauer, Peter Moser
University of Leoben, Chair of Mining Engineering and Mineral Economics , Leoben, Austria
Blasting fumes in underground workings
- 14:50 **Chris Braithwaite**, Jiri Pachman, Jiří Majzlík, David Williamson
SMF Group, Cavendish Laboratory, Cambridge University , Cambridge, United Kingdom
Improved experimental procedure for the large scale gap-test
- 15:10 **Michael Hutchinson**
AWE Aldermaston , Reading, United Kingdom
Replacing the equations of Fano and Fisher for cased charge blast equivalence
- 15:30 **Ahmed Elbeih**, Jiri Pachman, Svatopluk Zeman, Waldemar A. Trzciński, Zbyněk Akštein
University of Pardubice , Pardubice, Czech Republic
Advanced plastic explosive based on bicyclo-HMX compared with Composition C4 and Semtex 10
- 15:50–16:10 Coffee break
- 16:10 **Sara Cerri**, Manfred A. Bohn
Fraunhofer Institut fuer Chemische Technologie, ICT , Pfingztal, Germany
Ageing behaviour of rocket propellant formulations with ADN as oxidizer
- 16:30 Vinca Prana, Guillaume Fayet, **Patricia Rotureau**, Carlo Adamo
INERIS (Institut National de l'Environnement Industriel et des Risques) , Verneuil-en-Halatte, France
Prediction of impact sensitivity of nitro energetic compounds using QSPR approaches
- 16:50 **Miao Zheng**, Xin Yu, Lan Wei
Institute of Applied Physics and Computational Mathematics, Beijing , Beijing, China
Numerical simulation of STEVEN impact test
- 17:10 **Xin Yu**, Miao Zheng
Institute of Applied Physics and Computational Mathematics, Beijing , Beijing, China
Influence of pad or air gap between the high explosive and flyer
- 17:30 **Chaoyang Zhang**
China Academy of Engineering Physics , Mianyang, China
Interfacial interaction between double (010) faces of β -HMX

Third Session Chair: Thomas Klapoetke (Ludwig-Maximilians Univer., Munchen, Germany)

- 08:15 Meeting of third session speakers with chairman
- 08:40 **David Chavez** (*invited lecture*)
Los Alamos National Laboratory , Los Alamos, NM, USA
Recent efforts in tetrazine chemistry
- 09:10 Lei Wei, **Jian-Guo Zhang**, Jing-Yu Li, Tong-Lai Zhang, Yuan-Jie Shu
Beijing Institute of Technology , Beijing, China
Synthesis, characterization and properties of 5-nitraminotetrazole high nitrogen salts
- 09:30 **Robert Hudson**, Philip Gill
Cranfield University , Shrivenham, United Kingdom
Multi-person assessment of RDX crystal morphology using the RS-RDX round robin method
- 09:50 **Steven Hunter**, Carole A. Morrison, Colin R. Pulham, Peter J. Gould
University of Edinburgh , Edinburgh, United Kingdom
First-principles hydrostatic compression study of phase I of AP and alpha-, epsilon- and gamma- polymorphs of RDX
- 10:10 **Jie Sun**, Haobin Zhang, Yuan-Jie Shu, Xiaoyan Shu, Bin Kang, Yu Liu, Xiaofeng Liu
China Academy of Engineering Physics , Mianyang, China
Effects of additives on the crystal morphology of TATB
- 10:30 **Vladimir K. Golubev**
Russian Federal Nuclear Center , Sarov, Russia
Influence of structural and energetic factors on impact sensitivity of aromatic nitro compounds
- 10:50–11:10 Coffee break
- 11:10 **Sergey I. Gerasimov**, Andrey V. Len', Mikhail A. Ilyushin
Russian Federal Nuclear Center , Sarov, Russia
Excitation of PETN-charges with safe light-sensitive pyrotechnical compositions by incoherent light pulse sources
- 11:30 **Demitrios Stamatis**, Edward L. Dreizin
New Jersey Institute of Technology , Newark, NJIT
Thermal initiation of consolidated reactive nanocomposite powders
- 11:50 **James Tucker**, Philip Gill, John Hand
Cranfield University , Shrivenham, United Kingdom
Assessment of factors effecting stabiliser extraction from nitrocellulose based propellants
- 12:10 **Tuuli Grohn**, David Williamson, Gordon Morgan
University of Cambridge , Cambridge, United Kingdom
Energetic inks for screen printing
- 12:30 **Ruth Tunnell**, Paul Bunyan, Dave Tod
QinetiQ , Sevenoaks, United Kingdom
The use of accelerating rate calorimetry to understand the ageing behaviour of complex hybrid propellants
- 12:50–14:00 Lunch

Thursday, April 14

14th NTREM '11: Program

Fourth Session Chair: Stanislaw Cudzilo (Military University of Technology, Warsaw, Poland)

16:00–18:00 Poster session. See page 8 for the list of posters

17:00 The second meeting of Scientific Committee (at University Hall)

The evening program at Pardubice's Castle

(Is paid €10, payment during registration)

18:30–19:30 Visit of the exposition in the East Bohemia Museum

19:30–22:00 A friendly get-together in the Knight Hall

21:00 Fireworks

Fifth Session Chair: Adam Cumming (DSTL, Sevenoaks, UK)

- 08:15 Meeting of fifthsession speakers with chairman
- 08:40 Tatiana Pivina, David Lempert, **Alexandr Smirnov**, Dmitriy Khakimov (*invited lecture*)
State Scientific Research Institute of Mechanical Engineering , Dzerzhiksk, Russia
Estimation of basic characteristics for some energetic polynitrogen compounds
- 09:10 **Valery P. Sinditskii**, Manh C. Vu, Anna V. Burzhava, Alexey B. Sheremetev, Ludmila V. Batog
Mendelejev University of Chemical Technology , Moscow, Russia
Decomposition and combustion of 4,4'-bis[4-aminofurazanyl-3-azoxy]-3,3'-azofurazan and its macrocyclic analog
- 09:30 **Manfred A. Bohn**
Fraunhofer Institut fuer Chemische Technologie, ICT , Pfinztal, Germany
Generic formulation of performance assessment quantities for stability, compatibility and ageing of energetic materials
- 09:50 **Katarzyna Cieślak**
Warsaw University of Technology , Warsaw, Poland
Nitrocellulose's swelling process for liquid nitrate esters
- 10:10 **Olga Kovalchukova**, Oleg Volyansky, Andrew Alafinov, Adam Stash, Paul Strashnov, Alexander Shakhnes, Svyatoslav Shevelev, Konstantin Kobrakov
Peoples' Friendship University of Russia , Moscow, Russia
Some physico-chemical properties of products of chemical transformation of 2,4,6-trinitrotoluene
- 10:30–10:50 Coffee break
- 10:50 **Jose B. Ribeiro**, Cristóvão Silva, Ricardo Mendes
University of Coimbra , Coimbra, Portugal
Estimation of the Lee-Tarver reactive flow model parameters for an ammonium nitrate based emulsion explosive
- 11:10 Tereza Hudcova, Martin Halecky, Evguenii Kozliak, Marie Stiborova, **Jan Paca**
Institute of Chemical Technology, Department of Fermentation Chemistry and Bioengineering, Technicka 5, 166 28 , Prague, Czech Republic
Continuous aerobic degradation of dinitrotoluenes in packed bed reactors
- 11:30–12:00 Closing remarks, prize awarding

- P1 **Dmitriy Khakimov**, Marina Molchanova, Nina Makhova, Tatiana Pivina, Igor Ovchinnikov, Alexandr Kulikov
Zelinsky Institute of Organic Chemistry Russian Academy of Sciences , Moscow, Russia
The Puzzle of Diaminofuroxan
- P2 **Jonas Sarlauskas**
Institute of Biochemistry , Vilnius, Lithuania
Further exploration of 5,6,7,8-tetranitro-2,3-dihydro-1,4-benzodioxine (TNBD) – a potential thermostable HEDM
- P3 **Vladimir Bakharev**, Alexander Gidaspov, Vladimir Zalomlenkov, Irina Nazarova, Julia Palatova, Pavel Burkov
Samara State Technical University , Samara, Russia
Synthesis of mono-dinitromethyl-1,3,5-triazine salts
- P4 Alexander Gidaspov, **Vladimir Bakharev**, Vitaly Pepekin, German Afanasev, Yury Matushin
Samara State Technical University , Samara, Russia
Synthesis, physico-chemical and explosive properties of amino(oxo)-dinitromethyl-1,3,5-triazines
- P5 **Dennis Fischer**, Thomas M. Klapötke, Jörg Stierstorfer
Ludwig-Maximilian University of Munich , Munich, Germany
Salts of tetrazolone– low sensitivity secondary explosives
- P6 Konstantin Karaghiosoff, **Marcos A. Kettner**, Thomas M. Klapötke
Ludwig-Maximilian University of Munich , Munich, Germany
NMR evidence for oxalic acid dinitrate ester
- P7 **Joanna Adamiak**, Michał Szadkowski, Wincenty Skupiński
Warsaw University of Technology , Warsaw, Poland
Nitration of aromatic compounds with using solid catalysts: H₃PO₄/MoO₃/SiO₂ and H₃PO₄/WO₃/SiO₂
- P8 Hye-Rim Lee, In-Joo Bae, Jae-Chul Jung, Jin-Sug Kim, Hyung-Sug Kim, Young-Hwan Kwon, **Bum-Jae Lee**
Chungnam National University , Daejeon, South Korea
Novel synthetic methodology of 1,2,3-triazole-embedded energetic copolyacrylates by azide-alkyne click chemistry
- P9 **Alexander Dippold**, Thomas M. Klapötke, Franz A. Martin
Ludwig-Maximilian University of Munich , Munich, Germany
Synthesis and energetic properties of 5,5'-dinitrimino-3,3'-azo-1H-1,2,4-bistriazole – A promising RDX replacement
- P10 Alexander Dippold, Thomas M. Klapötke, **Franz A. Martin**
Ludwig-Maximilian University of Munich , Munich, Germany
Synthesis and energetic properties of novel nitramino- and nitrimino azoles and corresponding nitrogen rich salts
- P11 Alexander Dippold, Thomas M. Klapötke, **Michael Feller**
Ludwig-Maximilian University of Munich , Munich, Germany
Synthesis and energetic properties of 5,5'-dinitrimino-3,3'-methylene-1H-1,2,4-triazole and its nitrogen rich salts
- P12 **Alexander Astrat'ev**, Dmitry Dashko, Andrei Stepanov
SCTB Technolog , S.-Petersburg, Russia
Synthesis and some chemical properties of amidrazone of dinitroacetic acid

- P13 **Mikhail A. Ilyushin**, Irina V. Bachurina, Andrei V. Smirnov, Igor V. Tselinsky
St. Petersburg State Institute of Technology (Technical University) , St. Petersburg, Russia
New generation of energetic complex pentaamminecobalt(III) perchlorates
- P14 Thomas M. Klapötke, **Davin G. Piercey**
Ludwig-Maximilian University of Munich , Munich, Germany
A highly energetic compound containing a ten-nitrogen chain
- P15 **Carles Miró Sabaté**, Erwann Jeanneau, Henri Delalu
Université Claude Bernard Lyon 1 , Lyon, France
Reaction of 1,1-dimethylhydrazine with dichloromethane and energetic methathesis products
- P16 **Carles Miró Sabaté**
Université Claude Bernard Lyon 1 , Lyon, France
Energetic derivatives of symmetrical dimethylhydrazine (SDMH)
- P17 Thomas M. Klapötke, **Alexander Penger**, Carolin Pflüger
Ludwig-Maximilian University of Munich , Munich, Germany
Modified nitramines with low sensitivity
- P18 **Ahmed Elbeih**, Adela Husarova, Svatopluk Zeman
University of Pardubice , Pardubice, Czech Republic
Low sensitive HNIW
- P19 Thomas M. Klapötke, Burkhard Krumm, **Richard Moll**
Ludwig-Maximilian University of Munich , Munich, Germany
Synthesis and energetic properties of 1,1,1-trinitroethane
- P20 **Camilla Evangelisti**, Thomas M. Klapötke, Konstantin Karaghiosoff, Manfred A. Bohn
Ludwig-Maximilian University of Munich , Munich, Germany
2-nitro and 4-nitro-N-nitroso-N-ethylaniline: crystal structures and quantum chemical calculations
- P21 **Niko Fischer**, Thomas M. Klapötke, Jörg Stierstorfer, Elija Wiedemann
Ludwig-Maximilian University of Munich , Munich, Germany
Highly sensitive 3,5-diazidotriazole and the binary C2N9- anion
- P22 Thomas M. Klapötke, Thomas G. Müller, **Magdalena Rusan**
Ludwig-Maximilian University of Munich , Munich, Germany
The synthesis and characterization of 4,5-dinitroimidazolate salts
- P23 **Mateusz Szala**, Leszek Szymańczyk
Military University of Technology , Warsaw, Poland
Synthesis and properties of ammonium salt of 5-nitriminotetrazole
- P24 **Alexander M. Astachov**, Vitaliy A. Revenko, Aleksey G. Kozlov, Eduard S. Buka
Siberian State Technological University , Krasnoyarsk, Russia
Some properties of 1-(2,4,6-trinitrophenyl)-1,2-dinitroguanidine
- P25 **Alexander M. Astachov**, Pavel V. Brovchenko, William A. Sokolenko, Georgii E. Salnikov, Anatolii I. Rubailo
Siberian State Technological University , Krasnoyarsk, Russia
New NMR data of molecular dynamic of nitroguanidine

- P26 **Michael Herrmann**, Ulrich Förter-Barth, Paul Bernd Kempa
Fraunhofer Institut Chemische Technologie ICT , Pfinztal, Germany
Nanostructured, amorphous and liquid energetic materials investigated by X-ray diffraction
- P27 **Joanna Szczygielska**, Arkadiusz Muchalski, Paweł Maksimowski, Wincenty Skupiński
Warsaw University of Technology , Warsaw, Poland
Effect of impurities on the quality of CL-20 crystals obtained by recrystallization
- P28 **Ludmila A. Kruglyakova**, Rudolf S. Stepanov
Siberian State Technological University , Krasnoyarsk, Russia
Thermal decomposition of Mannich's bases on the base of 1-methyl-3-carbamido-1,2,4-triazole
- P29 **Yury Burov**
Russian Academy of Science , Chernogolovka, Russia
The thermal decomposition of 1,3-diphenyltriazene
- P30 **Ilya Zhukov**
Mendeleev University of Chemical Technology , Moscow, Russia
Calculation of enthalpy of formation of TATP and HMTD
- P31 **Michal Pexa**, Zdeněk Friedl
Brno University of Technology , Brno, Czech Republic
Relationship between bond disproportionation energy and molecular electrostatic potential
- P32 **Vladimir Dubovitskiy**, Yury Burov, Elena Ryabukhina
Russian Academy of Science , Chernogolovka, Russia
The conformational mechanism of influence of a high pressure for speed of monomolecular chemical reaction
- P33 **Lemi Türker, Taner Atalar**
TÜBİTAK Marmara Research Center, Chemistry Institute, 41470 GEBZE , Kocaeli, Turkey
1,3,3-trinitroazetidene (TNAZ) and some of its constitutional isomers: a DFT study
- P34 **Guillaume Fayet, Patricia Rotureau**, Carlo Adamo
INERIS (Institut national de l'environnement industriel et des risques) , Verneuil-en-Halatte, France
Predicting of the physico-chemical properties of nitroaromatic compounds using QSPR models
- P35 **Miroslav Pospíšil**, Pavel Vávra
Charles University in Prague , Prague, Czech Republic
Calculated crystal structure of 4,4'-dinitro-3,3'-diazenofuroxan
- P36 **Vladimir K. Golubev**
Russian Federal Nuclear Center , Sarov, Russia
Influence of charged and excited states on the mechanisms of hexamethylene triperoxide diamine decomposition
- P37 **David Millar**, Christopher Barry, Adam Cumming, Duncan Francis, Annette Kleppe, William Marshall, Petra Szilagyi, Colin R. Pulham
University of Edinburgh , Edinburgh, United Kingdom
Remarkable complexity of the metal azides: structural characterisation at extreme conditions

- P38 Eduard Aluker, Nadezhda Aluker, **Alexander Krechetov**, Anatoly Mitrofanov, Denis Nurmukhametov, Alexander Tupitzin, Nadezhda Poleeva
Kemerovo State University , Kemerovo, Russia
Absorption spectra of PETN and efficiency of laser initiation
- P39 **Alexander Krechetov**, Eduard Aluker, Anatoly Mitrofanov, Denis Nurmukhametov, Dmitry Malzev
Kemerovo State University , Kemerovo, Russia
Laser initiation of PETN containing light-scattering additives
- P40 Aduiev Boris P., **Nurmukhametov Denis R.**, Neljubina Nataliya V., Zvekov Alexandr A.
Institute of Carbon Chemistry and Material Science of the Siberian Branch of the RAS , Kemerovo, Russia
Regulation of PETN sensibility by Al nanoparticle additives during laser initiation
- P41 Aduiev Boris P., Belokurov Gennady M., **Grechin Sergey S.**
Institute of Carbon Chemistry and Material Science , Kemerovo, Russia
PETN monocrystals detonation under electron-beam initiation
- P42 Jiří Majzlík
University of Pardubice , Pardubice, Czech Republic
Activation of high-sensitivity energetic materials by electrostatic discharge using ESZ KTTV testing apparatus
- P43 Min-Jun Kim, Won-Bok Jeong, **Joo-Seung Chae**
Agency for Defense Development , DeaJeon, Korea
Crystal morphology and shock sensitivity in RDX based PBXN-109
- P44 Andrzej Orzechowski, **Dorota Powała**, Andrzej Maranda
Institute of Industrial Organic Chemistry , Warsaw, Poland
Influence of insensitive additives on usable parameters of PBX
- P45 **Pramod Soni**, Arjun Singh, Mahesh Kumar, Satish Kumar
TBRL, Defense Research and Development Organization (DRDO) , Chandigarh, India
Formulation and Evaluation of Plastic Bonded Explosive Compositions based on HMX and TATB
- P46 **Radovan Skácel**, Jan Zigmund, Zbyněk Akštein, Ladislav Říha, Kamil Dudek, Petr Nesvadba
Explosia, a.s.VÚPCH, Pardubice , Pardubice, Czech Republic
Plastic explosives with energetic binding systems
- P47 Seung-Il Choi, Jae-Kyeong Kim, Jun-Hyung Kim, **Kee-Kahb Koo**
Sogang University , Seoul, Korea
Coating of ammonium nitrate particles by slurry evaporation
- P48 **Radi Ganev**
Civil Engineering Higher School, (VSU) , Sofia, Bulgaria
Investigation on rate of formation of crystallisation centres of mixtures of TNT and ammonium nitrate
- P49 **Franziska Betzler**, Thomas M. Klapötke
Ludwig-Maximilian University of Munich , Munich, Germany
New energetic nitrogen rich polymers

- P50 **Svetlana Strashnova**, Yuri Grigoriev, Valery Domanskiy
Peoples' Friendship University of Russia , Moscow, Russia
Studies of explosive abilities of polinitrofluorenes
- P51 **Denis Mikheev**, Georgii Kozak, Pavel Chernikh, Vyacheslav Kuzmin
Mendelejev University of Chemical Technology , Moscow, Russia
Detonability of ammonium nitrate and mixtures on its base
- P52 **Anna Veprikova**, Vladimir Annikov, Vladimir Trunin, Vlada Raikova
Mendelejev University of Chemical Technology , Moscow, Russia
Investigation of detonation of watergel explosives containing polydisperse aluminum
- P53 **Ondřej Němec**, Martin Novotný, Marcela Jungová, Svatopluk Zeman
University of Pardubice , Pardubice, Czech Republic
Preliminary verification of fortification of W/O-type emulsions with demilitarized explosives based on TNT
- P54 **Ricardo Mendes**, Jose B. Ribeiro
ADAI, University of Coimbra , Coimbra, Portugal
Detonation of gun powder in emulsion explosive
- P55 Manuel Böhm, Niko Fischer, **Thomas M. Klapötke**, Susanne Scheutzow, Jörg Stierstorfer
Ludwig-Maximilian University of Munich , Munich, Germany
Experimentally determined detonation velocities of new secondary explosives
- P56 **Piotr Koslik**, Zenon Wilk, Karolina Nikolczuk, Andrzej Maranda
Institute of Industrial Organic Chemistry , Warsaw, Poland
The research of the explosive charge detonation in the air using numerical modelling methods
- P57 **Waldemar A. Trzciński**, Katarzyna Barcz, Józef Paszula, Stanisław Cudziło
Military University of Technology , Warsaw, Poland
Investigation of confined explosion of layered charges
- P58 Andrzej Maranda, Józef Paszula, Iwona Zawadzka-Malota, Bożena Kuczynska, Waldemar Witkowski, **Karolina Nikolczuk**, Zenon Wilk
Institute of Industrial Organic Chemistry , Warsaw, Poland
Aluminum powder influence on ANFO detonation parameters
- P59 **Jovica Bogdanov**, Zoran Bajić, Radenko Dimitrijević, Zlate Veličković
Military Academy , Belgrade, Serbia
Detonation parameters calculations of different high explosives using computer program XW
- P60 **Nebojsa Vucicevic**
Technical Test Center of Serbian Armed Forces , Belgrade, Serbia
Investigation of detonation transfer by explosion of munition in depots
- P61 **Stanisław Cudziło**, Sławomir Dyjak, Waldemar A. Trzciński
Military University of Technology , Warsaw, Poland
Preparation and characterization of monolithic nitrocellulose-cellulose composites
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Brodarski Institute – Marine Research & Advanced technologies , Zagreb, Croatia
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