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

***PROGRAM***

*(the third version)*

**of the nineteenth seminar**

# „NEW TRENDS IN RESEARCH OF ENERGETIC MATERIALS“

***NTREM 2016***

**held at the University of Pardubice**

Pardubice, the Czech Republic

**April 20th – 22nd, 2016**

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

**19TH INTERNATIONAL SEMINAR**
**"NEW TRENDS IN RESEARCH OF ENERGETIC MATERIALS"**
http://**www.ntrem.com**

**is supported by:**

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*US Army RDECOM – Atlantic*
*Institute of Shock Physics, Imperial College London, London*
*Nicolet CZ, Prague*
*Faculty of Chemical Technology, University of Pardubice,*

**The nineteenth** 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 *Modern Experimental Techniques and Diagnostics for Energetic Materials* 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 papers presented at this meeting will be quoted in the Chemical Abstracts (SciFinder).

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.

**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**: via web form should be done before the end of April 15th, 2016. Registration of participants after this date will take place at the University Hall:

April 19th 4:00PM - 7:00 PM
April 20th 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. ~ $140; €130) printed version and 500.- CZK (i. e. ~$ 20, € 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. SvatoplukZeman** | ***IEM, FCT, University of Pardubice, CR*** |

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Organizing committee of NTREM
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CR, European Union

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**E-mail:** seminar@ntrem.com


## Affiliated activities:

The first meeting of the ***SCIENTIFIC COMMITTEE*** will be carried out on Tuesday, **April 19th, 2016**, at 6 p.m. at the excursion boat **Arnost z Pardubic** (*anchoring on the Elbe river, near Ice Stadium*), the second one on Thursday, **April 21st, 2016,** at 16:30 in the University Hall – see page 7.

A friendly get-together for foreign participants and for workers and co-workers of IEM will be arranged at **Pardubice's Castle** on April 21st, 2016 – see page 15.

## Lecture program of the 19th NTREM – Wednesday April 20th

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

08:40 **Opening of seminar** – speech of Prof. Jiri Kulhánek, *vice-rector of Univ. Pardubice*

### *1. Session*

Chairman**:** Dr. Ruth Doherty
*Naval Surface Warfare Center, Indian Head Division, USA*

08:50 Aleksandr Smirnov, Aleksander Morozov, Tatyana Pivina *invited lecture*
Bakhirev State Scientific Research Institute of Mechanical Engineering, Dzerzhinsk,
**Experimental Determination and Calculation Estimation for Throwing-Action of HE**.

09:20 Steven W. Dean, Frank C. De Lucia, Jennifer L. Gottfried,
US Army Research Laboratory, Aberdeen Proving Ground, MD, USA
**Characterization of Laser-Driven Flyer Plates.**

09:40 Kyle Sullivan,
Lawrence Livermore National Lab, Livermore, California, USA
**Tailoring Material Reactivity Using Architecture.**

10:00 Ana-Mihaela Florea, Tanţa-Verona Iordache, Traian Rotariu, Carmen Lazau, Anita-Laura Radu, Andreea Voicu, Gabriela Toader, Steluta Apostol, Gheorghe Hubca and Andrei Sârbu
The National Institute for Research & Development in Chemistry and Petrochemistry, Bucharest,
**2,4,6-Trinitrotoluene Molecularly Imprinted Sol-Gel Sensing Films for Selective Sensors.**

10:20 Liang Zhang, Nan Yan,
Beijing Institute of Technology, Beijing, China
**Research on Output Energy of Micro-Charge Explosive Driven Flyer.**

**10:40 – 11:00 Coffee break**

11:00 Lotfi Maiz, Waldemar A Trzciński, Józef Paszula, Mateusz Szala
Military University of Technology, Warsaw, Poland
**Investigation of Confined Explosions of Composite and Layered Charges.**

11:20 Bradley W. White, Kyle T. Sullivan, Alexander E. Gash, Robert V. Reeves,
Lawrence Livermore National Laboratory, Livermore, California, USA
**Modeling the Deformation Behavior and Detonation Wave Dynamics in Reactive Materials.**

11:40 Michael M. Nardai, Manfred A. Bohn
Fraunhofer Institut für Chemische Technologie (ICT), Pfinztal, Germany
**Cohesive Zone Model Parameterization by Molecular Dynamics**

12:00 Karl S. Hope, Daniel Ward, Hayleigh J. Lloyd, Steven Hunter, Craig L. Bull, Colin R. Pulham
University of Edinburgh, Edinburgh, G.B.
**Putting the Squeeze on Energetic Co-Crystals - High Pressure Studies of 2(CL-20):HMX and NQ:DNP.**

**12:20 - 14:10 LUNCH BREAK**

*Prof. Adam Cumming and Dr. Ruth Doherty (2014)*

*Profs. Liudmila Krugliakova, Svatopluk Zeman and Tatiana Pivina (2015)*

*Prof. Jimmie Oxley (2015)*

## *2. Session*

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

14:00 **Meeting of all speakers** of the second Session with Chairman of this Session.

14:10 Manfred A. Bohn *invited lecture*
Fraunhofer Inst. für Chemische Technologie (ICT), Pfinztal, Germany
**Characterisation and Modelling of the Curing Reaction of HTPB with Isocyanate by Heat Flow Microcalorimetry**.

14:40 Yixue Li, Yang Zhou, Wen Qian, Wen Qian, Chaoyang Zhang, Bi He
China Academy of Engineering Physics, Mianyang, China
**Dissipative Particle Dynamics Studies on the Viscosity of Molten TNT Suspensions Containing RDX Nanoparticles.**

15:00 Amel Belaada, Waldemar Trzciński, Zbigniew Chylek, Jozef Paszula
Military University of Technology, Warsaw, Poland
**Study of a Melt-Cast Composition Containing NTO and FOX-7.**

**15:20 – 15:50 Coffee break**

15:50 Stefan Ek, Martin Skarstind, Mona Brantlind, Erik Holmgren,
The Swedish Defence Research Institute, Stockholm, Sweden
**Qualification of LMP-103S – an ADN-Based Satellite Propellant.**

16:10 Petar Shishkov, Milena Nedkova
University of Mining and Geology ”Sv.Ivan Rilski", Sofia, Sofia, Bulgaria
**Application of Long Term Stored Single and Double Base Propellants for Production of Pyrotechnic Rocket Engine.**

16:30 Charlotte Alliod, Julie-Anne Chemelle, Guy Jacob, Raphael Terreux
UMR 5305 CNRS – Univ. Lyon 1. Inst. de de Biologie et Chimie des Protéines (IBCP), Lyon, **AMES Test Prediction by “On-The-Fly” QSAR Applied to High-Energy Molecules.**

*Dr. Fred Volk (2004)*

*University Hall during the 17th Seminar NTREM (2014) proceedings*

*Dr. Woodward Waesche and Dr. Scott A. Shackelford (2007)*

## Lecture program of the 19th NTREM – Thursday April 21st

### *3. Session*

Chairman: Prof. Michel Lefebvre
*Royal Military Academy, Brussels.*

08:00 Miloslav Krupka *invited lecture*
OZM Research, Hrochuv Tynec, Czech Rep
**Practical Complications in Characterization of Energetic Materials.**

08:30 Zhang Jichuan, Li Shenghua, Pang Siping
Beijing Institute of Technology, Beijing, China
**Taming Dinitramide Anions within an Energetic Cationic Metal-Organic Framework via Simple Anion Exchange: a New Strategy for Synthesis and Tunable Properties of High Energy Materials.**

08:50 Dong Kai, Sun Chenghui, Pang Siping
Beijing Institute of Technology, Beijing, China
**Synthesis of Tetraacetylhexaazaisowurtzitane from Tetraacetyldibenzylhexa-azaisowurtzitane by Catalytic Hydrogenolysis Using a Continuous Flow Process.**

09:10 Leonid Fershtat, Margarita Epishina, Mikhail Makhov, Nina Makhova
Russian Academy of Sciences, Zelinsky Institute of Organic Chemistry, Moscow, Russia
**Synthesis of (1H-Tetrazol-5-yl)Furoxan Ammonium Salts via a Two-Step Dehydration/[3+2] Cycloaddition Approach.**

09:30 Yanyang Qu
China Academy of Engineering Physics, Mianyang, China
**Synthesis and Properties for Benzotriazole Nitrogen Oxides (BTzO) and Tris[1,2,4]triazolo[1,3,5]triazine Derivatives.**

09:50 Vitaly Kiselev, Nina Gritsan
Novosibirsk State University, Novosibirsk, Russia
**Unexpected Thermolysis Reactions for Insensitive Nitro-Amino Energetic Compounds Revealed by Highly Accurate Quantum Chemical Calculations.**

**10:10 – 10:30 Coffee break**

10:30 Anatoly Bragin, Alla Pivkina, Konstantin Monogarov, I. Fomenkov, A. Nikiforova, N. Muravyev
Semenov Institute of Chemical Physics RAS, Moscow, Russia
**Thermal Decomposition and Combustion Characteristics of 5-Amino-3,4-Dinitropyrazole.**

10:50 Cai-Xia Xu, Jian-Guo Zhang, Xin Yin,
Beijing Institute of Technology, Beijing, China
**Laser Sensitivity Primary Explosives: Synthesis and Properties of Complexes with 3-Hydrazino-4-amino-1,2,4-triazole (Hatr) as Ligand.**

11:10 Zongwei Yang, Yuan Ma, Xiaoqing Zhou, Qi Zhang, Rong Xu, Fude Nie, Hongzhen Li,
China Academy of Engineering Physics, Mianyang, China
**Formation of a Fine BTF-TNT Energetic Cocrystal by Spray Drying.**

11:30 Tomasz G. Witkowski, Thomas M. Klapötke
Ludwig-Maximilian University of Munich, Munich, Germany
**Synthesis and Investigation of the Novel Thermally Stable Explosive: TKX-55.**

11:50 Liu Jia Hui, Li Hong Zhen, Huang Bing, Liu Shi Jun, Liu Yong Gang
China Academy of Engineering Physics, Mianyang, China
**The Effects of HMX@TATB Core-Shell Composites on the Mechanical Properties of PBX**

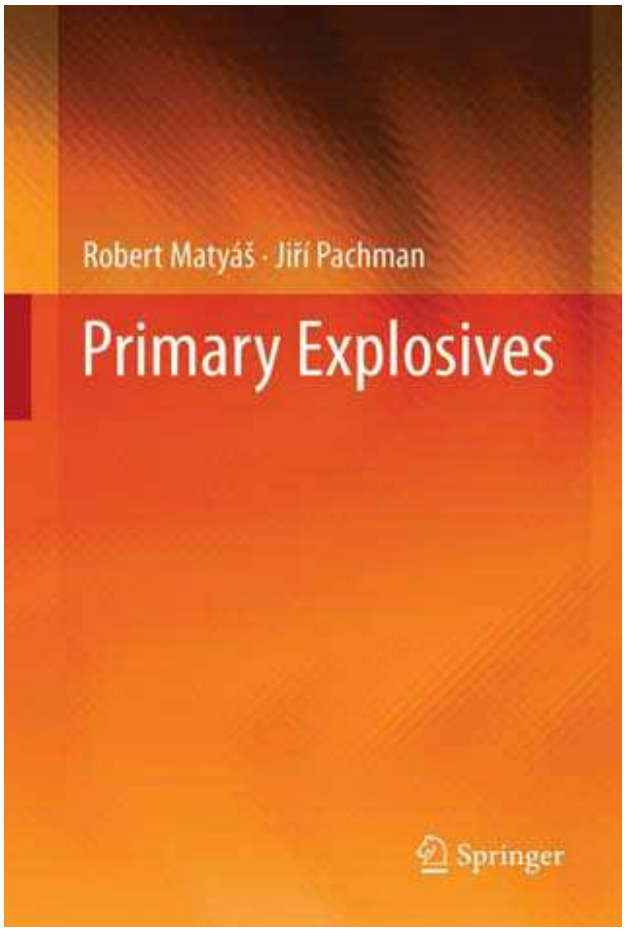
12:10 Zijian Lyu, Qian Huang, Xinping Long, Wen Wen, Ming Li, Yang Sha, Yushi Wen
China Academy of Engineering Physics, Mianyang, China
**Slow Cook-Off Response Mechanism of TATB-HMX Series Formulation in Iron Shell**

**12:30 – 14:10 LUNCH BREAK**

*4.* ***Session* – Poster program –** see on page 9

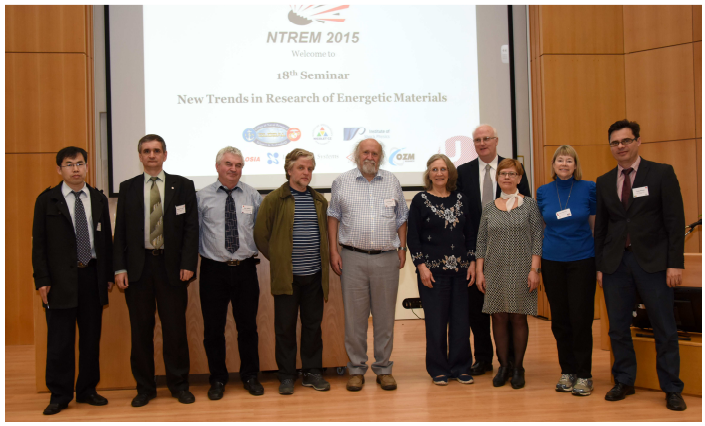
**16:30 The second meeting of Scientific Committee (*University Hall*)**

## A books advertising

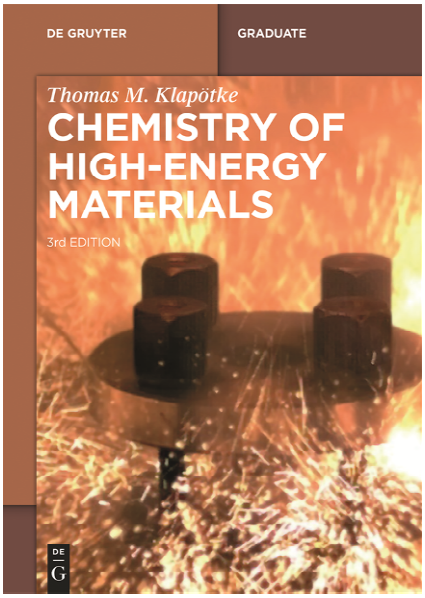



R. Matyáš, and J. Pachmáň,
**Primary Explosives,** Springer, Heidelberg 2012, ISBN 978-3-642-28435-9, €106.95

*Participants of the 18th Seminar NTREM in the University Hall on April 16th, 2015*




*Scientific Committee of the 18th Seminar NTREM, April 15th, 2015, in the University Hall*

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## Lecture program of the 19th NTREM – Friday April 22nd

### *5. Session*

Chairman: Prof. Adam Cumming
*University Edingburg, U.K.*

08:00 Jimmie C. Oxley, James L. Smith, Matthew M. Porter
University of Rhode Island, Kingston, RI, USA
**Solvent Suppression of Ions in API Mass Spectrometry.**

08:20 David Chavez, Damon Parrish, Lauren Mitchell,
Los Alamos National Laboratory, Los Alamos, NM, USA
**Energetic Trinitro and Fluoro-Dinitro ethyl ethers of 1,2,4,5-Tetrazine.**

08:40 Valery Sinditskii, Anton Chernyi, Serafima Yurova, A.Vasileva, D. Dashko, A. Astrat'ev,
Mendeleev University of Chemical Technology, Moscow, Russia
**Thermal Decomposition and Combustion of Cocrystals of CL-20 and Linear Nitramines.**

09:00 David Lempert, Ekaterina Dorofeenko, Svetlana Soglasnova, Alexei Matveev, Serge Aldoshin,
Russian Academy of Science, Chernogolovka, Russia
**The Relationship between Maximally Achieved Specific Impulse and the Acceptable Combustion Temperature in Metal-Free Formulations of Solid Composite Propellants**

09:20 Chaoyang Zhang, Xianggui Xue, Yushi Wen, Yu Ma,
Institute of Chemical Materials, CAEP, Mianyang, China
**Molecular Dynamics Simulations of the Responses of Some Typical Energetic Materials against Heating and Shock.**

09:40 Ke Wang, Yuan-Jie Shu, Ning Liu, Xiao-Yong Ding, Zong-Kai Wu, Min-Jie Wu, David Lempert,
Xi'an Modern Chemistry Research Instritute, Xi'an, China
**Computational Investigation on Performance and Structure of Six Novel Furazano-[3,4-d]-Pyridazine-Based Derivatives.**

**10:00 – 10:20 Coffee break**

10:20 Igor Plaksin, Ricardo Mendes, Luis Rodrigues, Svyatoslav Plaksin,
ADAI - Assoc. for Development of Industrial Aerodynamics, University of Coimbra, Portugal
**Characterization of detonation performance and shock reactivity of PBX-materials with use of Multi-Channel Optical Analyzer MCOA-UC.**

10:40 Alexander Lukin
Western-Caucasus Research Center, Tuapse, Russia
**Self-Organising of the Micro/Nano- Structures of the Reactionary Zones and Technologies for Quantum Modification of the Properties and Capabilities of the Energetic Materials.**

**11:00 – 12:00 CLOSING REMARKS including AWARDING OF PRIZES**

*The best lectures at the 18th NTREM (2015):*
*Ms. Marina Suntsova (Lomonosov State Univ.),*
*Mr. Karl S. Hope (University of Edingburgh),*
*Mr. Daniel W. Ward (Univ. of Edingburgh)*

*The best posters at the 18th NTREM (2015):*
*Mr. Lofti Maiz (Polytech. Military School, Alger),*
*Ms. Judyta Rećko (Military University of Techol., Warsaw),Mr. Martin Kűnzel (University of Pardubice)*

## Poster program of the 19th NTREM – Thursday April 21st

### *4. Session*

Chairman: Prof. Svatopluk Zeman
*University of Pardubice*

Posters should be hung on **Wednesday**, ***April 20th***, before 14:00. Special poster sessions will take place on Thursday (***April 21st***) from 14:00 up to16:30 h. During this time authors should be present for discussion at the posters.

**P.1** Thomas M. Klapoetke, Tomasz G. Witkowski,Zenon Wilk, Justyna Hadzik,
Ludvig-Maximillian University of Munich, Munich, Germany
**Investigation of Initiating Strength of Detonators Containing TKX-50, MAD-X1, PETNC, DAAF, RDX, HMX or PETN as a Base Charge.**

**P.2** Georgii Savenkov
Saint –Petersburg State Institute of Technology (Technical University), Russia
**Initiation of Explosive Transitions in Energy-Saturated Cobalt Salt and Nanosized Carbonic Additives Compounds by Means of High Current Electron Beam.**

**P.3** Jindřich Kučera, Petr Nesvadba, Martin Kunzel, Jiri Pachman
University of Pardubice, Pardubice, Czech Republic
**Measurement of Impact Velocity of Cladding Metal by Photonic Doppler Velocimetry (PDV).**

**P.4** Tudor V. Ţigănescu, Eugen Trană, Marin Lupoae, Florina Bucur, Elena A. Voicu, Gabriela Toader
Military Technical Academy, Bucharest, Romania
**Numerical Simulation of Blast Loaded Ti/Steel Foam/Ti Sandwich Plate.**

**P.5** Aline Cardoso Anastacio, Jiri Pachman, Jindrich Kucera,
University of Pardubice, Czech Republic
**Acceleration of Polymer Bonded Powder Metal Liner.**

**P.6** Adrian Rotariu, Eugen Trana, Traian Rotariu, Liviu Matache, Simona Badea
Military Technical Academy, Bucharest, Romania
**The Effect of an Annular Boric Acid Layer on the Shock Wave Generated by Explosive Charge Detonation.**

**P.7** Richard Kuracina, Zuzana Szabová, Matej Menčík, Karol Balog
Slovak University of Technology in Bratislava, Faculty of Materials Science and Technology in Trnava, Trnava, Slovakia
**Determination of the Maximum Explosion Pressure During Exposion of Organic Polymer.**

**P.8** Jovica Bogdanov, Zoran Bajić, Danica Simić, Uroš Anđelić, Radoslav Sirovatka, Radenko Dimitrijević
University of Defence, Military Academy, Belgrade, Serbia
**Blast Performance of Gun Propellants.**

**P.9** Andrzej Maranda, Andrzej Papliński
Military University of Technology, Warsaw, Poland
**Investigation of Sodium Azide Performance in Energetic Mixtures.**

**P.10** Matthew Weaver, Lisa Blair, Nathan Flood, Christopher Stennett,
Cranfield University, Defence Academy of the G.B., Shrivenham, UK
**A Review of the Mallet Impact Test for Small Scale Explosive Formulations.**

**P.11** Aleksandr Smirnov, Svatopluk Zeman, Tatyana Pivina,
State Sci. Res. Inst. of Mechanical Engineering after V.V. Bakhirev, Dzerzhinsk, Russia
**Impact Sensitivity Investigations of Individual Explosives: Comparison of the Different Experimental Evaluations.**

**P.12** David Lempert, Ekaterina Dorofeenko
Russian Academy of Science, Chernogolovka, Russia
**Organic Molecular Explosives Impact Sensitivity as Function of Thermochemical Parameters and Element Content.**

**P.13** Ning Liu, Qiang-li Zhao, Svatopluk Zeman, Ya-nan Li, Yuan-jie Shu, Bo-zhou Wang, Wen-liang Wang,
Xi'an Modern Chemistry Research Institute, Xi'an, China
**Crystal Morphology and Sensitivity of DNTF and FOX-7: Molecular Dynamics Simulation and Experimental Study.**

**P.14** Alexander Dubovik, Alexey Matveev
Mendeleev University of Chemical Technology, Moscow, Russia
**Chemical Interactions in Mixes Haloid Vinyl Polymers with Aluminium at Impact**.

**P.15** Thomas M. Klapötke, Philipp C. Schmid, Jörg Stierstorfer
Ludwig-Maximilian University of Munich, Munich, Germany
**Investigations on the Energetic Performance and Thermal Stability of N-Bonded Nitramines.**

**P.16** Muhamed Suceska, Ivona Matic
Brodarski institute, Zegreb, Croatia
**Numerical Modeling of Thermal Initiation of Explosives.**

**P.17** Abderrahmane Mezroua, Michel Lefebvre
Ecole Militaire Polytechnique, Algiers, Algeria
**Kinetic Study of the Thermal Degradation of Porous Ammonium Perchlorate-Based Composite Solid Rocket Propellant.**

**P.18** Tijen Seyidoglu, Manfred A. Bohn
Roketsan Missiles Industries Inc., Ankara, Turkey
**Effect of Butacene® on Ageing of Composite Propellants.**

**P.19** Larisa Demidova, Vladimir Sizov, Anatoliy Denisyuk
Mendeleev University of Chemical Technology, Moscow, Russia
**Catalyst Influence on Low-Calorie Propellant Combustion**.

**P.20** Yuanjie Shu, Jichuan Huo, Xiaoyong Ding, Bingwang Gou, Jianguo Zhang, Xuan Tian, Minjie Wu, Yuansheng Wang,
Xi'an Modern Chemistry Research Institute, Xi'an, China
**Study on Thermal Behaviour of AP/$LiBH_4$ Energetic System by Heat Flow Calorimetric Method.**

**P.21** Xiaoyong Ding, Yuanjie Shu, Jianguo Zhang, Bingwang Gou, Cailing Wang, Minjie Wu, Yanlong Zhu, Yuanshen Wang
Beijing Institute of Technology, Beijing, China
**Cook-off Study of AP/$LiBH_4$ Explosive.**

**P.22** Hong-Min Shim, Jae-Kyeong Kim, Byung-Chul Lee, Hyoun-Soo Kim, Kee-Kahb Koo,
Sogang University, Seoul, South Korea
**Preparation of Spherical Energetic Composites and their Thermal Decomposition Kinetics.**

**P.23** Evgeniy Miroshnichenko, Tatyana Kon'kova, Yuri Matyushin, Alexander Berlin,
N.N. Semenov Institute Of Chemical Physics, Russian Academy Of Sciences, Moscow
**Energies of Reorganization of Part Molecules in Radicals.**

**P.24** Liudmila A. Krugliakova, Rudolf S. Stepanov, Oksana A. Golubtsova, Konstantin V. Pekhotin
Siberian State Technological University, Krasnoyarsk, Russia
**The Influence of Structure on the Thermal Decomposition Rate of Substituted 5,5-Dinitro-1,3-Dioxanes.**

**P.25** Vladimir K. Golubev, Michael A. Ilyushin
Ludwig-Maximilian University of Munich, Munich, Germany
**Analysis of Primary Decomposition Events in Nitrotetrazolatoammines of Cobalt.**

**P.26** Paul Blankenhagel, Kirti Bhushan Mishra, Klaus-Dieter Wehrstedt, Jörg Steinbach
Bundesanstalt für Materialforschung und -prüfung (BAM), Berlin, Germany
**Thermal Radiation Impact of DTBP Fireballs.**

**P.27** Valeriy Domanskiy, Sergey Kostyukovskiy, Iury Iuninger, Igor Sobakin, Sergey Koshelev
Scientifical and Technological Center of Unique Instrumentation of RAS, Moscow, Russia
**New Family of Pyrometric Devices for Contactless Temperature Measurement of Energetic Materials.**

**P.28** Danica Simić, Radoslav Sirovatka, Uroš Anđelić, Jovica Bogdanov, Slavica Terzić,
Military Technical Institute, Belgrade, Serbia
**Thermobaric Effect Comparison of Cast Thermobaric PBX and TNT in Enclosure Test.**

**P.29** Ovidiu Iorga, Liviu Matache, Gabriel Epure, Adrian Rotariu, Viorel Tiganescu, Traian Rotariu
Scientific Research Center for CBRN Defnese and Ecology, Bucharest, Romania
**Experimental Techniqes for Measuring Overpressure Generated by Thermobaric Devices.**

**P.30** Dmitry Khakimov, Tatyana Pivina
Russian Academy of Sciences, Zelinsky Institute of Organic Chemistry, Moscow, Russia
**Comprehensive Analysis of Thermochemical Properties For 4,4',5,5'-Tetranitro-2,2'-Biimidazole Salts.**

**P.31** Abdelrazak Mouloud, Abdelkadir Kouadhi, Rida Cherif
Ecole Militaire Polytechnique, Algiers, Algeria
**Study of Aging of Double Base Rocket Propellants by Microcalorimetry. Assessment of Lifespan.**

**P.32** Guenter Mussbach, Manfred A. Bohn
Bayern-Chemie GmbH, Aschau am Inn, Germany
**Consumption of Atmospheric Oxygen as Ageing Indicator of Solid Rocket Propellant.**

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**P.40** Petar Shishkov
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**P.55** Rafał Lewczuk, *Mateusz Szala, Judyta Rećko*
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**PP.9** Mahvash Mossahebi Mohammadi, Yadollah Bayat
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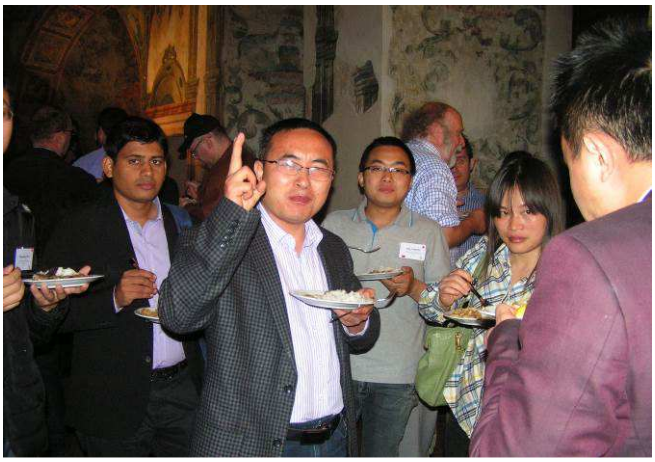
# Evening's program of the 19th NTREM – Thursday April 21st

**18:30 - 22:00** **EVENING PROGRAM** **(***at Pardubice's Castle* **)**
*http://www.visitpardubice.com/*

**18:30 - 19:30** Visit of the expositions in the East Bohemia Museum

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



# 19th SEMINAR - orientation map – town PARDUBICE