



# The 8th International Symposium on Energetic Materials and their Applications

## TECHNICAL PROGRAM

November 18–22, 2024  
Hitotsubashi Hall, Tokyo JAPAN

### 18 Nov. (Mon)

17:00 18:00	Registration (2F Lobby)
18:00 20:00	Welcome reception (Reception hall)

### 19 Nov. (Tue)

	Room 1	Room 2	Room 3
9:30 10:00	Opening (Room 1) / Registration (Entrance)		
	<b>A1 Detonation application</b> Chair: Kazuhiro Ishii	<b>B1 Debris and fragments</b> Chair: Tomotaka Homae	<b>C1 Liquid propellants 1</b> Chair: Kento Shiota
10:00 10:25	<b>A1-1 Invited speaker</b> <b>Demonstration of Liquid Propellant Rotating Detonation Engine System using Sounding Rocket S-520 No. 34</b> Ken Matsuoka, Japan	<b>B1-1 Small-scale experiments on the destruction of window glass by explosive blasts</b> Tomoharu Matsumura, Japan	<b>C1-1 Ignition and Combustion Characteristics of High Energetic Ionic Liquids propellant thruster</b> Kotaro Matsumoto, Japan
10:25 10:50		<b>B1-2 Falling Behavior of Debris in Field Explosion Experiments</b> Takahiro Tamba, Japan	<b>C1-2 The novel electrolytic combustor for ammonium dinitramide based energetic ionic liquid</b> Ryosuke Omori, Japan
10:50 11:15	<b>A1-2 Numerical Simulation on Two-Phase Detonation at Various Equivalence Ratios Using Eulerian-Eulerian Model for n-Heptane Fuel</b> Hyunseo Park, Japan	<b>B1-3 Focusing on a single fragment of a metal case via controlled fragmentation</b> Masahiro Tagawa, Japan	<b>C1-3 Ignition and combustion characteristics of ammonium dinitramide/ monomethylamine nitrate/ formohydrazide mixtures</b> Himari Tsuzaki, Japan
11:15 11:40	<b>A1-3 Numerical Study on Optimum Fuel Injection System for Supersonic Air Flow Assisted by Detonation Combustor</b> Moeno Miyashita, Japan		
11:40 13:00	Lunch		

	<b>A2 Shock compression of condensed matter 1</b> Chair: Shigeru Tanaka	<b>B2 Green propellants</b> Chair: Kotaro Matsumoto	<b>C2 Energy resources</b> Chair: Kenichi Takahashi
13:00 13:25	<b>A2-1 A generalization of the shock invariant relationship</b> Yasuyuki Horie, USA	<b>B2-1 Visualization of combustion phenomena in green-propellant thruster</b> Kazuyoshi Hayata, Japan	<b>C2-1 Spray combustion characteristics of a trial liquefied cellulose fuel</b> Yusuke Tanaka, Japan
13:25 13:50	<b>A2-2 Alternative Equation of State for Unreacted High Explosives</b> Kunihito Nagayama, Japan	<b>B2-2 Visual analysis on initial injection behavior of the high-viscosity green propellant flow</b> Hisayoshi Ito, Japan	<b>C2-2 Characteristics of low-concentration bioethanol fuel reforming with DME for internal combustion SI engines</b> Kota Taoka, Japan
13:50 14:15	<b>A2-3 Investigation of semi-empirical equation of state for detonation products</b> Shiro Kubota, Japan	<b>B2-3 [B<sub>3</sub>H<sub>8</sub>]<sup>-</sup> based hypergolic ionic liquids as eco-friendly propellant fuels</b> Ruilei Guo, China	<b>C2-3 Characteristics of freely propagation flames and explosion parameters of C<sub>2</sub>H<sub>2</sub> with varying equivalence ratio</b> Beibei Zhang, China
14:15 14:35	Break		
	<b>A3 Numerical modeling</b> Chair: Michael Hobbs	<b>B3 Hybrid rocket propellants</b> Chair: Kohei Matsui	<b>C3 Pyrotechnics 1</b> Chair: Satoru Yoshino
14:35 15:00	<b>A3-1 Invited speaker</b> <b>Advancements in models and methods for heterogeneous kinetics</b> Andrei Rotaru, Romania	<b>B3-1 Effects of Mg-Al Powder on Combustion Completeness of Boron Powder in Solid Fuels for Hybrid Rockets</b> Hironori Maeda, Japan	<b>C3-1 Thermomechanical Modeling of Exploding Foil Initiator with Micron-Sized Metallic Bridge</b> Kyoungjin Kim, South Korea
15:00 15:25		<b>B3-2 Hybrid rocket solid fuel with added cornstarch</b> Yuka Watanabe, Japan	<b>C3-2 3D printing of perchlorate-based low explosives composition using vat photopolymerization method</b> Takahiro Okano, Japan
15:25 15:50	<b>A3-2 The reaction mechanism for nitrocellulose spontaneous ignition based on quantum chemistry computations</b> Yu-ichiro Izato, Japan	<b>B3-3 Performance Evaluation of HTPB/Nitrous Oxide Hybrid Propellant</b> Sachin Sonage, India	<b>C3-3 Research on a nanothermite system with virtually non-existent condensed phase combustion products and ultra-efficient reactivity</b> Jingwei Li, China
15:50 16:15	<b>A3-3 Thermal decomposition mechanism of nitrocellulose based on slow-heating thermal analysis</b> Katsumi Kato, Japan	<b>B3-4 High-Performance Wax-based Fuel for Hybrid Rocket</b> Harpreet Kaur, India	
16:15 16:35	Break		
	<b>A4 Combustion and detonation</b> Chair: Yuta Sugiyama	<b>B4 Blasting 1</b> Chair: Yoshiaki Takahashi	<b>C4 Energetic materials for propellants 1</b> Chair: Toshiyuki Katsumi
16:35 17:00	<b>A4-1 Detonation experiments of the cocrystals and the mixtures of fuel and oxidizer</b> Kazuki Inoue, Japan	<b>B4-1 Numerical Analysis of Rock Fracture Process in Air-deck Blasting to Clarify Its Effect on Rock Fragmentation and Ground Vibration Control</b> Gyeongjo Min, Japan	<b>C4-1 Current research on energetic nitro substituted cubane derivatives at LMU Munich</b> Burkhard Krumm, Germany

17:00 17:25	<b>A4-2</b>	<b>Turbulent flame propagation and extinction behaviors and mechanisms in solid particle cloud combustion</b> Yu Xia, Japan	<b>B4-2</b>	<b>Tunnel blasting using site-mixing bulk emulsion explosives</b> Kenji Murata, Japan	<b>C4-2</b>	<b>Enzymatic nitration of azoles using horseradish peroxidase for the safe syntheses of energetic materials</b> Hayato Sano, Japan
17:25 17:50	<b>A4-3</b>	<b>Self-ignition of hydrogen-air mixture before a destructible sand screen</b> Sergey Golovastov, Russia	<b>B4-3</b>	<b>Numerical and Experimental Investigation on Near-field Underwater Explosion of Aluminized Explosive</b> Yuanxiang Sun, China	<b>C4-3</b>	<b>Decreasing hygroscopicity of ammonium dinitramide cocrystallization with dibenzo-18-Crown-6 and exploring the cocrystallization potential of its derivatives</b> Ming Chieh Lin, Taiwan
17:50 18:15	<b>A4-4</b>	<b>Flame propagation in a channel with porous metal at low pressures</b> Grigory Bivol, Russia	<b>B4-4</b>	<b>Research status and application prospects of non explosive rock fracturing technology represented by expansion fracturing with liquid CO<sub>2</sub></b> Xiaoguang Zhou, China	<b>C4-4</b>	<b>Construction of Hollow Molybdenum Oxide H-MoO<sub>3</sub> and Its Application in Nanothermites and Propellants</b> Cheng Dong, China

20 Nov. (Wed)

	<b>A5 Analysis and detection of explosives</b> Chair: Jun Nakamura		<b>B5 Detonation initiation</b> Chair: Nobuyuki Tsuboi		<b>C5 Pyro-technique safety devices and systems for mobility</b> Chair: Mieko Kumasaki	
10:00 10:25	<b>A5-1</b>	<b>Invited speaker</b> <b>Investigating the Aging of HMTD: Sensitivity, Detectability, and Explosive Properties Over Time</b> Ondřej Vodochodský, Czech Republic	<b>B5-1</b>	<b>Deflagration-to-Detonation transition process caused by interaction between shock wave and flame</b> Genta Matsumoto, Japan	<b>C5-1</b>	<b>Temperature-resolved Raman Spectroscopy during Thermally Cycling of Potassium Nitrate-doped Ammonium Nitrate Prepared by Aqueous Solution Method under Different Methods and Conditions</b> Shingo Date, Japan
10:25 10:50						
10:50 11:15	<b>A5-2</b>	<b>Trace Detection of Headspace Components in Smokeless Powders utilizing Thermal Desorption - Gas Chromatography/Mass Spectrometry coupled to Dynamic Air Sampling for Canine Applications</b> Dawn Mills, USA	<b>B5-3</b>	<b>Effect of fuel jet on propagation of detonation in a linear detonation channel</b> Faming Wang, Japan		
11:15 11:40	<b>A5-3</b>	<b>Mapping subsurface objects using non-contact wide-area ground penetrating radar</b> Alexander Vorozhtsov, Russia	<b>B5-4</b>	<b>Suppression of Deflagration-to-Detonation Transition by Porous Walls</b> Kenji Kashiro, Japan		
11:40 13:00	Lunch					
	<b>PL1 Plenary lecture 1</b> Chair: Katsumi Katoh					
13:00 14:00	<b>PL1</b>	<b>Development in the field of homemade explosives - TACP</b> Robert Matyáš, Czech Republic				
14:00 14:20	Break					
	<b>A6 Explosive properties 1</b> Chair: Shingo Date		<b>B6 Solid rocket propellants 1</b> Chair: Kenichi Takahashi		<b>C6 Pyrotechnics 2</b> Chair: Yosuke Nishiwaki	
14:20 14:45	<b>A6-1</b>	<b>Invited speaker</b> <b>Exploding kitty litter—A WIPP accident</b> Michael Hobbs, USA	<b>B6-1</b>	<b>Effect of Low-Ambient Pressure on Laser Ignition for B/KNO<sub>3</sub></b> Kohei Matsui, Japan	<b>C6-1</b>	<b>Investigation of multicomponent nanothermite systems with biocidal additives</b> Sergei Sokolov, Russia
14:45 15:10						

15:10 15:35	<b>A6-2</b>	<b>Synthesis of pyrazole based melt-castable energetic materials</b> Elena Reinhardt, Germany	<b>B6-3</b>	<b>High speed imaging of composite propellant surface in combustion using high intensity UV light</b> Ryuga Itaki, Japan	<b>C6-3</b>	<b>Microstructure-Controlled Al/KClO<sub>4</sub> Particles Prepared via Vibration-Induced Droplet Coalescence Technique</b> Yinning Zeng, China
15:35 16:00	<b>A6-3</b>	<b>Shaping silver nitrotetrazolate into a viable primary explosive</b> Marcus Lommel, Germany	<b>B6-4</b>	<b>Enhancement of Solid Rocket Propulsion Performance by Adding Negative Catalysts</b> Daiki Nagamachi, Japan		
16:00 16:20	Break					

	<b>Poster Room</b>					
	<b>P Poster session</b> Chair: Kento Shiota					
16:20 18:00	<b>P1-P43</b>					

## 21 Nov. (Thu)

	<b>A7 Pyrotechnics 3</b> Chair: Shogo Tomiyama		<b>B7 Blast wave and shock</b> Chair: Masahiro Tagawa		<b>C7 Energetic materials for propellants 2</b> Chair: Hiroki Matsunaga	
10:00 10:25	A7-1	<b>Invited speaker</b> <b>Co-Crystallisation Studies of Ammonium Dinitramide</b> Akachai Khumsri, United Kingdom	B7-1	<b>Development of Mach stem behind a scaled blast wall around a magazine</b> Kaname Sawaguchi, Japan	C7-1	<b>Experiments on an aluminum burner with nitrogen as the carrier gas</b> Yusuke Kida, Japan
10:25 10:50			B7-2	<b>Blast-wave mitigation by “blast-wave trap” with cushion materials installed on an L-shaped square tube</b> Tomotaka Homae, Japan	C7-2	<b>Investigating Energetic Additives in Single Base Propellant</b> Deepak Govindaraj, India
10:50 11:15	A7-2	<b>Characterization of Fe/CuO pyrotechnic compositions</b> Léo Courty, France	B7-3	Withdrawn	C7-3	<b>Synthesis of triazole fuel by electrolytic oxidation using water as solvent</b> Masato Sudo, Japan
11:15 11:40			B7-4	<b>Investigation of soil removal effect using underwater explosion phenomenon</b> Hayate Ueda, Japan		
11:40 13:00	Lunch					
	<b>PL2 Plenary lecture 2</b> Chair: Kenichi Takahashi					
13:00 14:00	PL2	<b>The environmental impact of composite solid rocket propellants: where do we stand now?</b> Filippo Maggi, Italia				
14:00 14:20	Photo / Break					
	<b>A8 Blast injury and shock interaction</b> Chair: Tei Saburi		<b>B8 Solid rocket propellants 2</b> Chair: Koki Kitagawa		<b>C8 Explosive properties 2</b> Chair: Yu-ichiro Izato	
14:20 14:45	A8-1	<b>Invited speaker</b> <b>Recent findings on the mechanisms and pathophysiology of blast-induced traumatic brain injury from studies using laser-induced shock waves</b> Satoko Kawauchi, Japan	B8-1	<b>A high-pressure structural study of ammonium dinitramide</b> Qi Feng Chan, United Kingdom	C8-1	<b>Construction and Characteristic Energy Initiation Mechanism of Carbon Quantum Dots Modified Copper Azide Photosensitive Energetic Material</b> Xuwen Liu, China
14:45 15:10			B8-2	<b>Evaluation of the effect of wall regression on internal flow field of star grain solid rocket motor using numerical analysis</b> Shinichiro Ogawa, Japan	C8-2	<b>Design of energetic molecular hybrids of 2-(dinitromethylene)-1,3-diazacyclopentane (DNDZ) and calculation of their detonation performance parameters</b> Lamla Thungatha, South Africa

15:10 15:35	<b>A8-2</b>	<b>Shock wave propagation through multiple material layer</b> Toshiharu Mizukaki, Japan	<b>B8-3</b>	<b>Burning surface observation of Low melting temperature Thermo plastic Propellant</b> Sohta Mitsuhashi, Japan	<b>C8-3</b>	<b>The Synthesis, Characterization, and Mechanical Testing of Derivatized Energetic Acrylate Polymers</b> Valerie Kuehl, USA
15:35 16:00	<b>A8-3</b>	<b>Experimental study on the effect of flame retardant non-woven fabric interaction on shock wave pressure attenuation</b> Kiyonobu Ohtani, Japan	<b>B8-4</b>	<b>Development of Small Nozzleless Solid Rocket Motor Using GAP/AP Propellant</b> Muto Sonobe, Japan		
16:00 16:20	Break					
	<b>A9 Thermal properties</b> Chair: Ken Okada		<b>B9 Blasting 2</b> Chair: Min Gyeongjo		<b>C9 Liquid propellants 2</b> Chair: Toshiyuki Katsumi	
16:20 16:45	<b>A9-1</b>	<b>Cookoff of Ammonium Nitrate with AI, Fuel Oil, and Nitromethane</b> Michael Hobbs, USA	<b>B9-1</b>	<b>Study on the Applicability of Shaped Charges to Cylinder Cut Blasting Techniques</b> Junha Kim, South Korea	<b>C9-1</b>	<b>Reactivity analysis of ADN/hydrazide mixtures in liquid phase</b> Yuki Yano, Japan
16:45 17:10	<b>A9-2</b>	<b>Study on the accidental combustion phenomenon of emulsion explosive in the pyrite blasting operation</b> Shoujun Zhu, China	<b>B9-2</b>	<b>Experimental investigation of the effect of restraint conditions on the explosion power of nitromethane</b> Yoshiaki Takahashi, Japan	<b>C9-2</b>	<b>Combustion characteristics of energetic ionic-liquid based on ammonium dinitramide and monomethylamine nitrate</b> Kento Shiota, Japan
17:10 17:35	<b>A9-3</b>	<b>Detailed reaction simulation of autoxidation of methyl acrylate based on computational chemistry</b> Michiya Fujita, Japan	<b>B9-3</b>	<b>Numerical investigation of behaviors of nitromethane under the various shock loading conditions</b> Shiro Kubota, Japan	<b>C9-3</b>	<b>Investigation of reaction conditions for continuous synthesis of dinitramide salts with small tube reactor</b> Hiroki Matsunaga, Japan
17:35 18:00	<b>A9-4</b>	<b>Understanding Amorphous Energetic Materials</b> Monica C. Chandwani, United Kingdom	<b>B9-4</b>	<b>Terminal Effects of Blast Wave Propagation of Prilled, Pulverised and Consolidated ANFO and ANIS</b> Pholisa Ngcebesha, South Africa		
18:30 20:30	Gala dinner (Gakushi kaikan)					

## 22 Nov. (Fri)

	<b>A10 Shock compression of condensed matter 2</b> Chair: <b>Kazutaka Kitagawa</b>	
9:30 9:55	<b>A10-1 The making of UniPore through explosive welding, an overview</b> Kazuyuki Hokamoto, Japan	
9:55 10:20	<b>A10-2 Shock Imprinting Technology Using Underwater Shock Waves Derived from Explosives and Polymer Molds</b> Shigeru Tanaka, Japan	
10:20 10:30	Break	
	<b>PL3 Plenary lecture 3</b> Chair: <b>Shingo Date</b>	
10:30 11:30	<b>PL3 Risk assessment of hydrogen refuelling stations for social implementation</b> Atsumi Miyake, Japan	
11:30 12:00	Closing	
13:00 18:00	Excursion	



21 Nov. (Thu), 16:20-18:00 **Poster room**

<b>P Poster session</b> Chair: Kento Shiota	
P1	<b>Case study of the 2022 Bergerac accident: origins, decomposition mechanisms and domino's effects</b> Florent Pessina, France
P6	<b>Thermal explosion analysis and simulation model establishment of HATO</b> Yanru Wang, China
P7	<b>Experiments on the possibility of the blast mitigation by vegetation around a high explosive</b> Yuta Sugiyama, Japan
P8	<b>Thermal stability of ammonia borane in ionic liquids as a hydrogen carrier</b> Yuta Nakamura, Japan
P9	<b>Quantitative risk analysis for hydrogen refueling station with methylcyclohexane dehydrogenation equipment</b> Naoto Hatogai, Japan
P10	<b>A detailed mechanism for the formation reaction of triacetone triperoxide in isopropyl alcohol based on quantum chemistry calculations</b> Kanta Sugahara, Japan
P11	<b>Identification of accident scenarios based on the detailed structure of water electrolyzers</b> Izumi Hirayama, Japan
P12	<b>Interaction between underwater explosion and the concave curved wall</b> Hayate Ueda, Japan
P13	<b>Development of a hazard register from risk assessment of a hydrogen refueling station</b> Jun Furota, Japan
P14	<b>Basic research on the design of structures for protection against explosions</b> Shota Sonoda, Japan
P15	<b>A Study on the Improvement of Blasting Efficiency in a Limestone Open Pit Mine Using an Electronic Blasting System</b> Seungjoong Lee, South Korea
P16	<b>A Case Study on Reducing Blasting Vibrations and Accelerating Excavation Schedules for Urban Cultural Heritage Sites Using Electronic Detonators</b> Seungwon Jung, South Korea
P17	<b>Numerical study for evaluating the vibration reduction effect in the tunneling direction using different medium</b> Daewon Lee, South Korea
P18	<b>Particle size control and crystal habit modification of ammonium perchlorate using intensified crystallization processes</b> Chieshaan Su, Taiwan
P19	<b>Investigation of morphology-controllable synthesis of CuO and their catalytic efficiency for ammonium perchlorate</b> Lixiao Shen, China
P20	<b>Investigation of the catalytic effects of mono/bimetallic organic framework derivatives on ammonium perchlorate</b> Zhenxin Yi, China
P21	<b>Kinetic analysis for the pyrolysis of Zeolitic Imidazolate Framework-8</b> Yuta Yoshimitsu, Japan
P22	<b>Reaction pathway search to unlock the potential of hypergolic ionic liquids; Automatic quantum chemical reaction path search when transition state structure cannot be imagined</b> Miori Nogamida, Japan

P23	<b>Simulations of the hypergolic reaction of monomethylhydrazine and nitrogen tetroxide mixtures using a detailed kinetics model</b> Tomohiro Omura, Japan
P24	<b>Assesment of Hydrogen Peroxide Based Hypergolic Bipropellants through Characterisation and Screening of Compatible Fuels</b> Shouei Yiu, Germany
P25	<b>The effect of flow rate and voltage on the combustion of ammonium dinitramide based energetic ionic liquid</b> Ryosuke Omori, Japan
P26	<b>Analysis of the combustion characteristics of Ammonium dinitramide and Hydroxyethylhydrazium nitrate mixture</b> Gaku Furuno, Japan
P27	<b>Effects of transition metal cathode materials on the electrolysis ignition of ammonium dinitramide and hydroxylethylammonium nitrate mixtures</b> Natsuki Kato, Japan
P28	<b>Pyrolysis Gas Analysis of Low Melting Point Thermoplastics with Additives for Hybrid Rocket Propellants</b> Yuki Ono, Japan
P29	<b>Withdrawn</b>
P30	<b>Minimum burning pressure test of bulk emulsion for the purpose of introducing UN test into Japan Industrial Standards</b> Takahiro Tamba, Japan
P31	<b>Exothermic reaction of magnalium powder with water</b> Yosuke Nishiwaki, Japan
P32	<b>Fire extinguishing behavior consisting of citric acid derivatives and oxidizer</b> Mana Fujimoto, Japan
P33	<b>Energetic Performance of GO/Al/CuO Thermite Composites Influenced by Metal Oxidizer Particle Size and Morphology</b> Jun Jing Teh, Singapore
P34	<b>Hazard Evaluation of Fireworks Compositions Containing Nitrocellulose</b> Asato Imahayshi, Japan
P35	<b>Thermal decomposition behaviors of HMX/AP propellants</b> Koichiro Urano, Japan
P36	<b>Thermal decomposition behavior of nitrocellulose membranes for immunochromatography</b> Miou Makino, Japan
P38	<b>Basic research on the mechanical properties of UniPore structure with various base material at high-velocity impact</b> Masatoshi Nishi, Japan
P39	<b>Preparation of bulk Al-Ti-V-Cr-Si low-density high-entropy alloy using shock consolidation</b> Yuto Yoshiichi, Japan
P40	<b>Influence of synthetic hydrotalcite addition on the combustion behavior of guanidine nitrate/basic copper nitrate-based gas generator</b> Yuichiro Nagamatsu, Japan
P42	<b>Synthesis and characterization of nitrocellulose using <i>Okara</i> (soybean-curd refuse) as a raw material</b> Keiji Aritomi, Japan
P43	<b>Kinetic analysis of the oxidation of methyl acrylate by in situ UV-vis absorption spectroscopy</b> Haruyuki Yamanishi, Japan