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

	A2 Shock compression of condensed matter 1 Chair: **Shigeru Tanaka**		B2 Green propellants Chair: **Kotaro Matsumoto**		C2 Energy resources Chair: **Kenichi Takahashi**	
13:00 13:25	A2-1	**A generalization of the shock invariant relationship** Yasuyuki Horie, USA	B2-1	**Visualization of combustion phenomena in green-propellant thruster** Kazuyoshi Hayata, Japan	C2-1	**Spray combustion characteristics of a trial liquefied cellulose fuel** Yusuke Tanaka, Japan
13:25 13:50	A2-2	**Alternative Equation of State for Unreacted High Explosives** Kunihito Nagayama, Japan	B2-2	**Visual analysis on initial injection behavior of the high-viscosity green propellant flow** Hisayoshi Ito, Japan	C2-2	**Characteristics of low-concentration bioethanol fuel reforming with DME for internal combustion SI engines** Kota Taoka, Japan
13:50 14:15	A2-3	**Investigation of semi-empirical equation of state for detonation products** Shiro Kubota, Japan	B2-3	**$[B_3H_8]^-$ based hypergolic ionic liquids as eco-friendly propellant fuels** Ruilei Guo, China	C2-3	**Characteristics of freely propagation flames and explosion parameters of C_2H_2 with varying equivalence ratio** Beibei Zhang, China
14:15 14:35	Break					
	A3 Numerical modeling Chair: **Michael Hobbs**		**B3 Hybrid rocket propellants** Chair: **Kohei Matsui**		**C3 Pyrotechnics 1** Chair: **Satoru Yoshino**	
14:35 15:00	A3-1	**Invited speaker** **Advancements in models and methods for heterogeneous kinetics** Andrei Rotaru, Romania	B3-1	**Effects of Mg-Al Powder on Combustion Completeness of Boron Powder in Solid Fuels for Hybrid Rockets** Hironori Maeda, Japan	C3-1	**Thermomechanical Modeling of Exploding Foil Initiator with Micron-Sized Metallic Bridge** Kyoungjin Kim, South Korea
15:00 15:25			B3-2	**Hybrid rocket solid fuel with added cornstarch** Yuka Watanabe, Japan	C3-2	**3D printing of perchlorate-based low explosives composition using vat photopolymerization method** Takahiro Okano, Japan
15:25 15:50	A3-2	**The reaction mechanism for nitrocellulose spontaneous ignition based on quantum chemistry computations** Yu-ichiro Izato, Japan	B3-3	**Performance Evaluation of HTPB/Nitrous Oxide Hybrid Propellant** Sachin Sonage, India	C3-3	**Research on a nano-thermite system with virtually non-existent condensed phase combustion products and ultra-efficient reactivity** Jingwei Li, China
15:50 16:15	A3-3	**Thermal decomposition mechanism of nitrocellulose based on slow-heating thermal analysis** Katsumi Katoh, Japan	B3-4	**High-Performance Wax-based Fuel for Hybrid Rocket** Harpreet Kaur, India		
16:15 16:35	Break					
	A4 Combustion and detonation Chair: **Yuta Sugiyama**		**B4 Blasting 1** Chair: **Yoshiaki Takahashi**		**C4 Energetic materials for propellants 1** Chair: **Toshiyuki Katsumi**	
16:35 17:00	A4-1	**Detonation experiments of the cocrystals and the mixtures of fuel and oxidizer** Kazuki Inoue, Japan	B4-1	**Numerical Analysis of Rock Fracture Process in Air-deck Blasting to Clarify Its Effect on Rock Fragmentation and Ground Vibration Control** Gyeongjo Min, Japan	C4-1	**Current research on energetic nitro substituted cubane derivatives at LMU Munich** Burkhard Krumm, Germany

17:00 17:25	A4-2	**Turbulent flame propagation and extinction behaviors and mechanisms in solid particle cloud combustion** Yu Xia, Japan	B4-2	**Tunnel blasting using site-mixing bulk emulsion explosives** Kenji Murata, Japan	C4-2	**Enzymatic nitration of azoles using horseradish peroxidase for the safe syntheses of energetic materials** Hayato Sano, Japan
17:25 17:50	A4-3	**Self-ignition of hydrogen-air mixture before a destructible sand screen** Sergey Golovastov, Russia	B4-3	**Numerical and Experimental Investigation on Near-field Underwater Explosion of Aluminized Explosive** Yuanxiang Sun, China	C4-3	**Decreasing hygroscopicity of ammonium dinitramide cocrystallization with dibenzo-18-Crown-6 and exploring the cocrystallization potential of its derivatives** Ming Chieh Lin, Taiwan
17:50 18:15	A4-4	**Flame propagation in a channel with porous metal at low pressures** Grigory Bivol, Russia	B4-4	**Research status and application prospects of non explosive rock fracturing technology represented by expansion fracturing with liquid CO_2** Xiaoguang Zhou, China	C4-4	**Construction of Hollow Molybdenum Oxide H-MoO_3 and Its Application in Nanothermites and Propellants** Cheng Dong, China

20 Nov. (Wed)

		A5 Analysis and detection of explosives Chair: **Jun Nakamura**		B5 Detonation initiation Chair: **Nobuyuki Tsuboi**		C5 Pyro-technique safety devices and systems for mobility Chair: **Mieko Kumasaki**
10:00 10:25	A5-1	**Invited speaker** **Investigating the Aging of HMTD: Sensitivity, Detectability, and Explosive Properties Over Time** Ondřej Vodochodský, Czech Republic	B5-1	**Deflagration-to-Detonation transition process caused by interaction between shock wave and flame** Genta Matsumoto, Japan	C5-1	**Temperature-resolved Raman Spectroscopy during Thermally Cycling of Potassium Nitrate-doped Ammonium Nitrate Prepared by Aqueous Solution Method under Different Methods and Conditions** Shingo Date, Japan
10:25 10:50			B5-2	**Observation of Detonation Initiation by a Spherical Projectile Using The Soap Bubble Filled with a Combustible Mixture** Ryoto Sato, Japan	C5-2	**The Effect of humidity on the thermal properties of nitrates** Satoru Yoshino, Japan
10:50 11:15	A5-2	**Trace Detection of Headspace Components in Smokeless Powders utilizing Thermal Desorption-Gas Chromatography/Mass Spectrometry coupled to Dynamic Air Sampling for Canine Applications** Dawn Mills, USA	B5-3	**Effect of fuel jet on propagation of detonation in a linear detonation channel** Faming Wang, Japan		
11:15 11:40	A5-3	**Mapping subsurface objects using non-contact wide-area ground penetrating radar** Alexander Vorozhtsov, Russia	B5-4	**Suppression of Deflagration-to-Detonation Transition by Porous Walls** Kenji Kashiro, Japan		
11:40 13:00	Lunch					
	PL1	**Plenary lecture 1** Chair: **Katsumi Katoh**				
13:00 14:00	PL1	**Development in the field of homemade explosives - TACP** Robert Matyáš, Czech Republic				
14:00 14:20	Break					
		A6 Explosive properties 1 Chair: **Shingo Date**		**B6 Solid rocket propellants 1** Chair: **Kenichi Takahashi**		**C6 Pyrotechnics 2** Chair: **Yosuke Nishiwaki**
14:20 14:45	A6-1	**Invited speaker** **Exploding kitty litter—A WIPP accident** Michael Hobbs, USA	B6-1	**Effect of Low-Ambient Pressure on Laser Ignition for B/KNO_3** Kohei Matsui, Japan	C6-1	**Investigation of multicomponent nanothermite systems with biocidal additives** Sergei Sokolov, Russia
14:45 15:10			B6-2	**Ignition Criteria of Laser Ignition for B/KNO_3 in Low-Temperature Environment** Koki Kitagawa, Japan	C6-2	**Combustion Behavior of Ethanol-Based Gel Fuel with Metal Powder** Yitong Chen, Japan

15:10 15:35	A6-2	**Synthesis of pyrazole based melt-castable energetic materials** Elena Reinhardt, Germany	B6-3	**High speed imaging of composite propellant surface in combustion using high intensity UV light** Ryuga Itaki, Japan	C6-3	**Microstructure-Controlled Al/$KClO_4$ Particles Prepared via Vibration-Induced Droplet Coalescence Technique** Yinning Zeng, China
15:35 16:00	A6-3	**Shaping silver nitrotetrazolate into a viable primary explosive** Marcus Lommel, Germany	B6-4	**Enhancement of Solid Rocket Propulsion Performance by Adding Negative Catalysts** Daiki Nagamachi, Japan		
16:00 16:20	Break					

	Poster Room
	P Poster session Chair: **Kento Shiota**
16:20 18:00	**P1-P43**

21 Nov. (Thu)

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

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

22 Nov. (Fri)

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

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

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

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