

The 11th Clayteam Seminar

Clayteam Poster Session

List & Map

Time & Date: 14:40~15:45, Nov. 13, 2012

Venue: Lobby, 11F, AIST Tokyo Waterfront-Annex

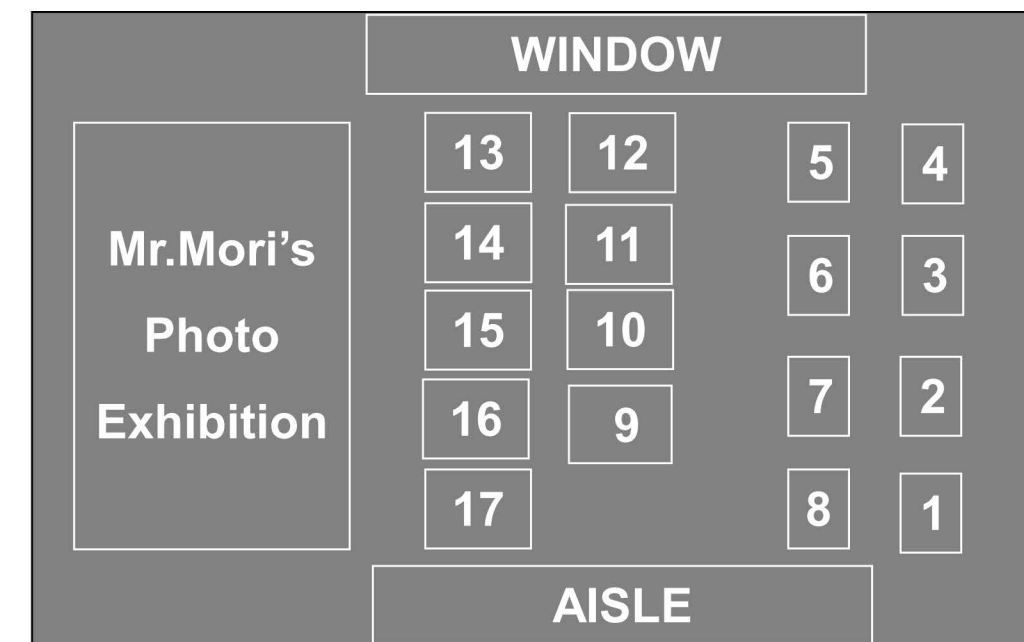
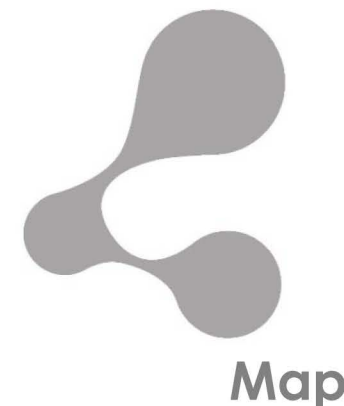


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No.	Title	Organization	Presented by	Abstract
1	A Novel Method of Solidifying Powdered Material by Compression Shear Method at Room Temperature	Center for Interdisciplinary Research (CIR), Tohoku University	Hiroyuki Miki	A new method of solidifying metal powder by dynamic molding under compression stress was developed. In the solidified specimen, recrystallization is suppressed, so that nanoscale crystal grains remain. The hardness of the specimen prepared by this process is increased relative to materials prepared by other methods. The material properties and preferred orientation of an aluminum plate with crystal grains 100–200 nm in diameter prepared by the new molding process are reported. The correlation between the crystal structure and properties of crystallization are clarified.
2	The ion exchange of magadiite with alkylphosphonium ions	Waseda University, Ogawa Labo (Graduate School of Creative Science and Engineering)	Masashi Morita	Intercalation of alkylphosphonium ions into the interlayer space of a layered sodium silicate, magadiite (Na ₂ Si ₁₄ O ₂₉), was investigated. The ion exchange was conducted in aqueous media and the products were characterized by X-ray diffraction, IR and TG. The ion exchange process and the structures and properties of the products are discussed in comparison with the ion exchange with quaternary ammonium ions, which are well known guest species of layered silicates.
3	Preparation of nanometer sized layered double hydroxides	Waseda University, Ogawa Labo (Graduate School of Creative Science and Engineering)	Shota Naito	Layered double hydroxides (abbreviated as LDHs) are a class of layered materials whose structure is composed of brucite (Mg(OH) ₂) like layers in which some of the divalent cations (Mg, Co, Ni, Cu, Zn, etc) have been replaced by trivalent cations (Al, Cr, Co, Fe, etc), giving positively charged sheets and the charge compensating interlayer anions (CO ₃ ²⁻ , SO ₄ ²⁻ , Cl ⁻ , NO ₃ ⁻ , etc). LDHs have extensively been investigated for such applications as catalysts, adsorbents, bioactive nanocomposites, electrochemical reactions, reaction media for controlled photochemical and ceramic precursors. The morphology (particle size, shape, etc) is a key issue to achieve optimized performance of LDHs in several applications. For this, we have been interested in the morphosyntheses of LDHs using several reaction paths. In the present presentation, we will summarize the synthetic methods, which we have developed in this decade.
4	Possible interactions of chitin and synthetic saponite	Waseda University, Ogawa Labo (Graduate School of Creative Science and Engineering)	Kanji Saito	The use of chitin, an abundant natural resource composed of N-acetylglucosamine unit, is limited due to the difficulty to process in desired forms. In this study, chitin and synthetic saponite (Sumecton SA, Kunimine Ind. Co.) were mixed to obtain aqueous mixture for possible processing as hybrids by means of two different set-ups; one is the dispersing in water after mixing them by planetary ball mill (Planet M2-3, Gokin Planetaring Inc.) and the other is mixing of chitin with synthetic saponite in water using wet type super atomizer (C-ES, Yoshida Kikai Co.). In both cases, stable suspension containing chitin and saponite formed and from the suspension, shape controlled solid products such as film are available. The detailed conditions of the mixing and the characterization of the products will be presented.

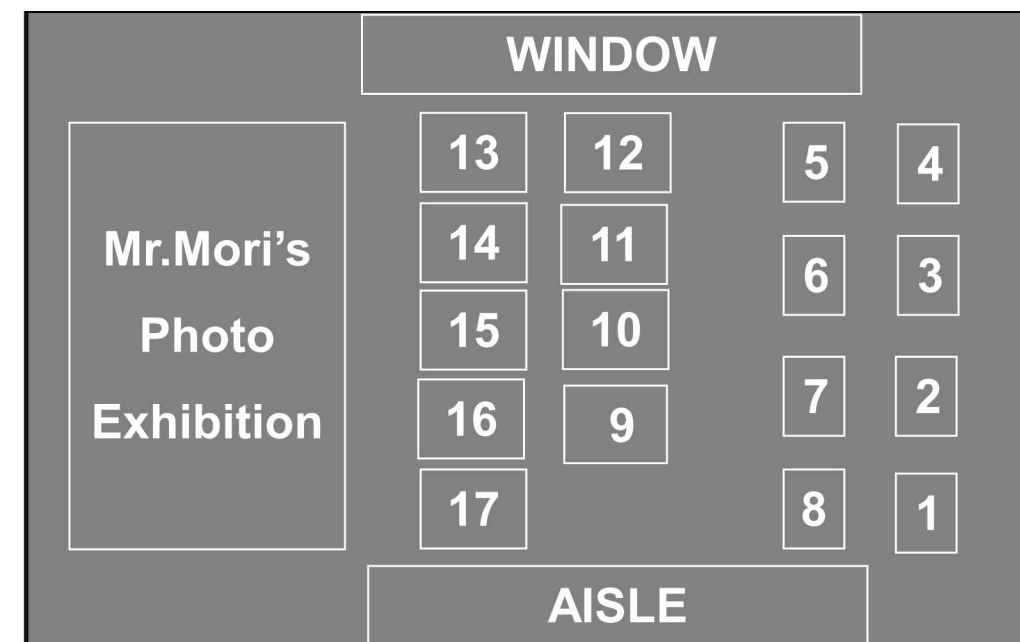


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5	Reaction in flow reactor using dye-saponite-TiO ₂ hybrid film as photocatalyst	Waseda University, Ogawa Labo (Graduate School of Creative Science and Engineering)	Takehito Goto	We have recently reported the improved photostability of a cationic dye (tris (2,2'-bipyridine) ruthenium(II), abbreviated as [Ru(bpy) ₃] ²⁺ , Sigma-Aldrich Co.) on TiO ₂ by complexing the dye with saponite (Sumecton SA, Kunimine Ind. Co.) ¹ . Motivated by the success, the [Ru(bpy) ₃] ²⁺ -saponite intercalation compounds complexed with titania was deposited on a flow reactor device as visible light responsive photocatalyst and N-alkylation of benzylamine with ethanol was conducted under visible light (> 420 nm) irradiation. ¹ Ogawa M., Sohmiya M. and Watase Y. (2011) "Stabilization of photosensitizing dyes by the complexation with clay" Chem. Commun., 47, 8602-8604.
6	Capturing and Identificaiton of reactive radicals in the environment by using radical trapping clay sheet	Yokohama National University, Sakakibara Labo	Hiroki Saito	To capture and indentify reactive radicals in the environment , we have prepared radical capturing clay sheets in which radical trapping reagent or radical scavenging reagent are intercalated in the clay layers. Radical adducts formed by the trapping reaction with radical trapping reagents in the clay sheets are stable enough for the clear identification by Mass , ESR, or HPLC analyses.
7	Fabrication and properties of synthetic clay for transparent clay films	クニミネ工業株式会社	篠木 進	透明粘土膜用合成粘土として、透明性と成膜性を兼ね備えた合成粘土の開発に取り組んでいる。今回は現段階において有益な特性が得られている開発品について紹介する。
8	新規粘土フィルムの開発	住友精化株式会社	坂東 誠二	住友精化は産業技術総合研究所・コンパクト化学システム研究センター・蛭名武雄チーム長との共同研究および東京理科大学・理工学部・山下俊准教授の技術指導の下、新規の粘土フィルムを開発しました。この粘土フィルム(タフクレースト)は優れたガスバリア性と不燃性を有するクレーストの弱点であった機械的な脆弱さをカバーしたもので、クレーストに比較して飛躍的にハンドリング性能を向上させたものです。 開発したフィルムは、約450°Cの耐熱性を持ち、室温から350°Cまで加熱した後の収縮率が0.04%と非常に小さい。また、約10ppm/°Cの低い線膨張係数、プラスチック材料の中で最高レベルの難燃性、ポリイミド並みの電気絶縁性、ポリイミドよりも優れた水蒸気バリア性などの特性を持ちます。特に耐候性が高く、85°C85%RHの高温耐湿試験で6500時間変化がないことを確認しております。また、絶伝導率が1~2W/m・K(垂直)と一般的プラスチックの約5倍の熱伝導性を持つため、伝熱・放熱材料としての開発も進めております。



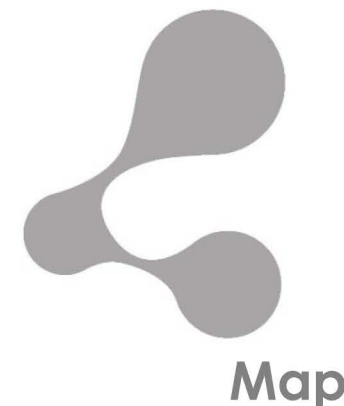
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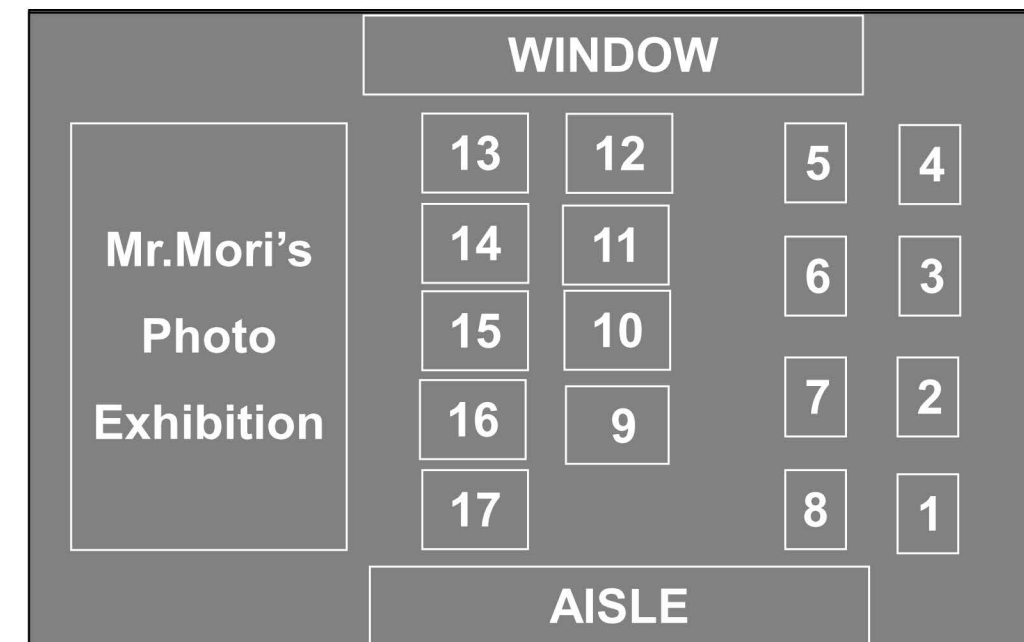
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9	Development of a coating material with world's highest hydrogen gas barrier property and incombustible property	株式会社宮城化成	伊藤 佑輝	The developed new water/alcohol based coating paste is containing specially treated clay and an alcohol-soluble heat-resistant plastic. Its viscosity is adjustable, so that in addition to self-supporting film by solution casting process, surface coating by spray coating process is possible. A self-supporting film made from the paste has the world's highest hydrogen barrier, exceeding conventional clay films. The produced film acquire water resistance by simply drying, solving the problem of the low water resistance of conventional clay films. In addition, high water vapor barrier properties can also be realized by a heat treatment of more than 200 degree centigrade. It is also confirmed that the coating film, to enhance non-flammable property of a plastic material.
10	Introduction of Thailand Science Park	MTEC	-	The Thailand Science Park is the country's first science park and to date, the only one in operation. It was established by the Ministry of Science and Technology to be the hub for the private sector's industrial R&D activities. The park started its operations in 2002, under the management of the National Science and Technology Development Agency (NSTDA). It was positioned an ideal location for companies to set up their science and technology based operations in Asia. The park provides services ranging from technology transfer from universities and technology centers, to financial assistance and business incubation. These services are readily accessible to the park's tenants as well as the private sector at large.
11	The Refractive Index Change with conjugated Polymer and Its Mechanism before and after Photo-irradiation	Department of Pure and applied Chemistry, Faculty of Science and Technology, Tokyo University of Science, Yamashita Labo	Kota Shinohara	Photo optical effect is one of the techniques to induce refractive index change by photo-irradiation, which is potential technology for optical data processing and so on. We determined refractive index change of a conjugated polymer, DEO-PPV, under photoirradiation by spectroscopic ellipsometry, and the mechanism of the refractive induction was also determined with transient spectroscopy.
12	Relation of heating and SRG formation due to the rotation of the light-driven molecular motor	Department of Pure and applied Chemistry, Faculty of Science and Technology, Tokyo University of Science, Yamashita Labo	Shohei Ogino	Molecular motors are one of the photochromic molecules which rotates one way by photoirradiation and thermal treatment. We have prepared polymer films containing the molecular motors to generate surface relief grating (SRG) by the molecular motor motion upon photoirradiation. SRG formation was confirmed by topological image of the sample by AFM measurement. In addition, irradiation was carried out at various temperatures, which shows the depth of the grating becomes larger with increasing temperature.

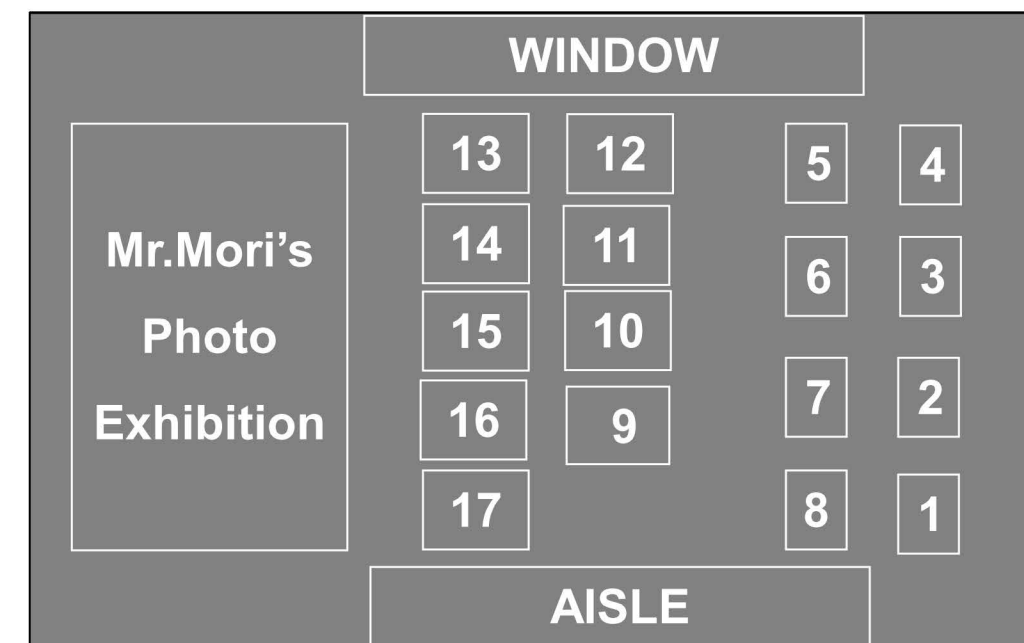
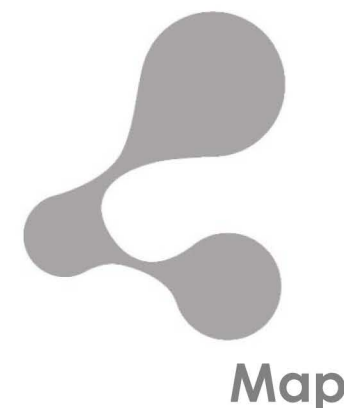


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13	photo induced surface Relief Patterning of Polybenzoxazole	Department of Pure and applied Chemistry, Faculty of Science and Technology, Tokyo University of Science, Yamashita Labo	Motoshi Mino	Polybenzoxazole (PBO) is one of the super engineering plastics with high thermal stability, and low dielectric constants. We have found that a t-BOC protected poly(hydroxy amide) (PHA), a precursor of the PBO, generates surface relief pattern upon photoirradiation and following thermal treatment in the presence of a photo acid generator (PAG), TAZ-110 without development. This material is expected as a novel technique of surface patterning for display or printable electronics devices. Mechanism for the pattern formation is discussed in this paper.
14	Evaluation of high strength Gel containing Carbon nanotube	Department of Pure and applied Chemistry, Faculty of Science and Technology, Tokyo University of Science, Yamashita Labo	Keisuke Suzuki	In this study, we focused on the double-network gel (DN Gel) which has high mechanical strength. By dispersing carbon nanotube (CNT), a high-strength material which contracts itself by irradiating the light having a certain wavelength. We prepared DN Gel containing CNT, and searched its mechanical properties. Those new gel materials with CNT structure was successfully prepared.
15	Clay Membrane with Penetrate Holes Prepared from Clay Hydrous Gel by Ice-Needle crystallization	Research Center for Compact Chemical System , AIST	Ryo Ishii	We have prepared porous clay membranes from the clay gels using a freezing and a vacuum drying processes. The SEM observations revealed that the membranes possess channel-like holes whose diameter in between several to several ten micrometers. The oxygen permeability and acetaldehyde absorption tests indicate that the holes are penetrated from the bottom to the top of the membrane although they have not ideal strait channels. The mechanism of the formation of the holes is proposed; the freezing process yields ice-seeds on a substrate and the seeds grow along a direction to perpendicular to the substrate. The resultant needle-ice crystals lead to formation of channel-like penetrated holes in the membrane. Furthermore, composite membranes with the penetrate holes could be prepared with ZSM-5 or mordenite particles. As the result, we have developed novel-clay-based-membranes with many penetrate holes, which widen to apply for the reactor or filter devices.
16	Advanced Film Technology	Research Center for Compact Chemical System , AIST	Takeo Ebina	AIST has been developing "Claist(R)," a film material with clay as the principal constituent, and working to put it to practical use. AIST also developed clays for film and coating pastes provides Claist layer under corroborations with private companies. The coating layer realizes one or more properties such as; gas barrier property, heat durability, fire redundancy, and so on. The viscosity of the pastes is adjustable, so that in addition to self-supporting film by solution casting process, surface coating by spray coating process is possible. These pastes are widely applicable to various materials such as, plastics, woods, metals, composite materials, and so on.
17	Microwave absorption property on the micron-order materials and it's application	Tokyo Metropolitan University, Advanced Institute of Industrial Technology	Yoshinori Kanno	Microwave absorption property on the micron-order materials and it's application