BULLETIN
OF THE
CHEMICAL SOCIETY OF JAPAN

http://www.csj.jp/journals/bcsj/

Volume 78, Number 1, January 2005

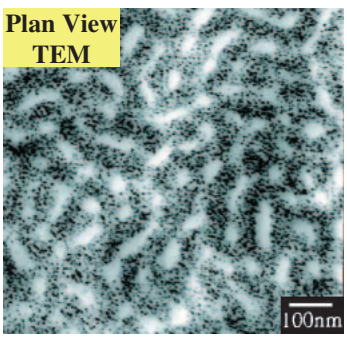
Award Accounts

The Chemical Society of Japan Award for 2002

"Mechanics" of Molecular Assembly: Real-Time and In-Situ Analysis of Nano-to-Mesoscopic Scale Hierarchical Structures and Nonequilibrium Phenomena

T. Hashimoto

Bull. Chem. Soc. Jpn., **78** (2005) 1–39



We have presented in-situ and real-time studies of the mechanics of molecular assembly for molecular mixtures via phase transition and under shear flow in the length scale from nm to μm. The studies also cover self-assembly of block copolymers.

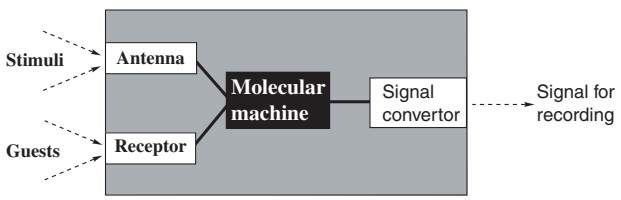
The Chemical Society of Japan Award for 2003

Molecular Design of Synthetic Receptors with Dynamic, Imprinting, and Allosteric Functions

S. Shinkai* and M. Takeuchi

Bull. Chem. Soc. Jpn., **78** (2005) 40–51

In this account, we introduce the concept of molecular design for molecular or ion recognition systems exhibiting dynamic, imprinting, and allosteric functions, particularly focusing on our own recent research achievements related to sugar sensing systems.



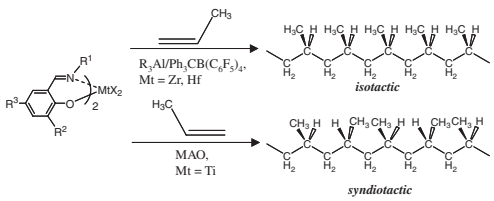
The Chemical Society of Japan Award for Creative Work for 2003

Propene Polymerization with Bis(phenoxy–imine) Group 4 Transition Metal Complexes

H. Makio and T. Fujita*

Bull. Chem. Soc. Jpn., **78** (2005) 52–66

Group 4 bis(phenoxy–imine) complexes can polymerize propene into either *isotactic* or *syndiotactic* polypropenes. The *isospecific* polymerization is mediated by a site control mechanism with successive 1,2-insertions, contrasting to the *syndiospecific* polymerization that is derived from the chain-end chirality of 2,1-inserted monomers.

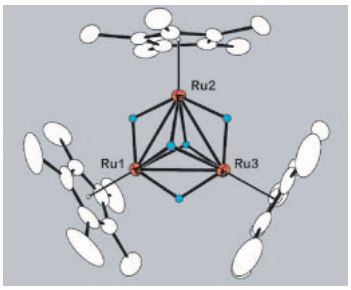


BCSJ Award Article

Synthesis, Structures, and Reactions of Coordinatively Unsaturated Trinuclear Ruthenium Polyhydrido Complexes, [{Ru(C_5Me_5)}$_3$(μ-H)$_6$](Y) (Y = BF_4, CF_3SO_3, 1/2(SO_4), $C_6H_5CO_2$, CH_3CO_2, $B(C_6H_5)_4$, PF_6) and [{Ru(C_5Me_5)}$_3$(μ-H)$_3$(μ_3-H)$_2$]

H. Suzuki,* T. Kakigano, K. Tada, M. Igarashi, K. Matsubara, A. Inagaki, M. Oshima, and T. Takao

Bull. Chem. Soc. Jpn., **78** (2005) 67–87



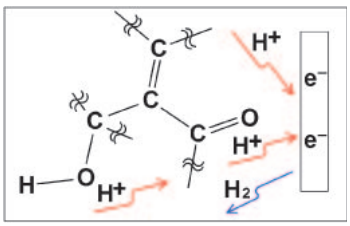
Coordinatively unsaturated triruthenium pentahydride, [{Ru(C_5Me_5)}$_3$(μ-H)$_3$(μ_3-H)$_2$], underwent H/D exchange with deuterated aromatic compounds via an intermediary η^2-arene complex, and reacted with active small molecules, such as O_2, CH_3I, and CO, with retention of the Ru_3 framework.

Articles

Investigation of the Structure and Stability of an Alcohol-Based Polymer for Hydrogen Storage in the Form of Ions

H. Matsuura,* T. Tanikawa, S. Ushiba, and M. Ogawa

Bull. Chem. Soc. Jpn., **78** (2005) 88–94

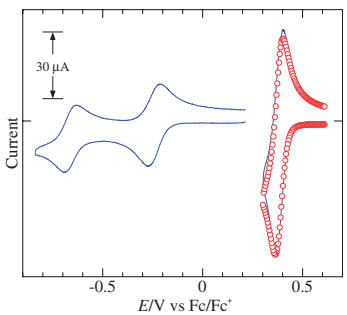


The control of the stable state for the storage of hydrogen ions and a simultaneous unstable state for the extraction of hydrogen is an important technology, since ions can be easily extracted by the application of an electric potential.

Redox Properties and Basicity of Keggin-Type Polyoxometalate Complexes

S. Himeno,* M. Takamoto, R. Santo, and A. Ichimura

Bull. Chem. Soc. Jpn., **78** (2005) 95–100

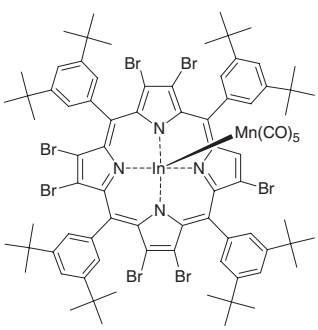


A simulation of the cyclic voltammogram gave the relative basicity of Keggin-type polyoxometalate complexes: α-[$XMo_{12}O_{40}$]$^{n-}$ (X = S, P, As, Si, Ge; n = 2–4) and α-[$XW_{12}O_{40}$]$^{n-}$ (X = S, P, As, Si, Ge, B, Al; n = 2–5). According to the basicity, the Keggin anions were classified into four groups. As a result, their voltammetric properties were systematized in various organic solvents.

Synthesis and Characterization of New Metal–Metal Bonded Heptabromo Porphyrin

S. Takagi,* H. Furuta, T. Yagi, and H. Yamada

Bull. Chem. Soc. Jpn., **78** (2005) 101–106



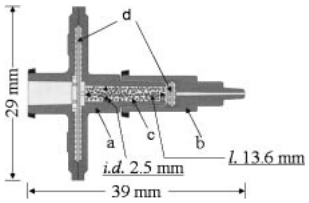
A new porphyrin hbtbppIn–$Mn(CO)_5$ that showed high stability against electroreduction and photo-irradiation has been synthesized. In the process of indium insertion to the octabromoporphyrin, we observed a Br loss phenomenon.

Selected Paper

Multielement Determination of Trace Metals in Seawater by ICP-MS Using a Chelating Resin-Packed Minicolumn for Preconcentration

Y. Zhu, A. Itoh, and H. Haraguchi*

Bull. Chem. Soc. Jpn., **78** (2005) 107–115



a) Prefilter tube, b) Prefilter tube, c) Chelex 100 resin, d) Membrane filter (pore size 0.45 μm).

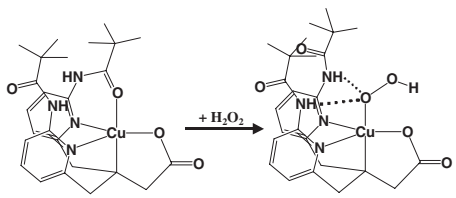
A chelating resin-packed minicolumn was developed to pretreat seawater samples for the determination of trace metals by inductively coupled plasma mass spectrometry (ICP-MS). The recoveries for 23 elements (Mn, Co, Ni, Cu, Zn, Y, Cd, all-REEs, Pb, and U) were more than 80%.

Synthesis, Characterization, and Thermal Stability of New Mononuclear Hydrogenperoxocopper(II) Complexes with N_3O-Type Tripodal Ligands Bearing Hydrogen-Bonding Interaction Sites

S. Yamaguchi, A. Kumagai, S. Nagatomo, T. Kitagawa, Y. Funahashi, T. Ozawa, K. Jitsukawa, and H. Masuda*

Bull. Chem. Soc. Jpn., **78** (2005) 116–124

The reaction of Cu(II) complexes with N_3O ligands bearing pivalamido groups with H_2O_2 was studied, and the hydrogenperoxocopper complexes generated were activated by introducing a carboxylate group, although they were stabilized by hydrogen-bonding interactions.

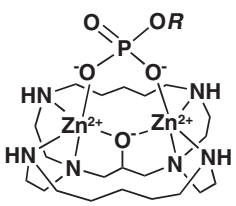


Selected Paper

An Alkoxide-Bridged Dinuclear Zinc(II) Hexaazacryptate: A Novel Phosphate Capture Molecule in Aqueous Solution

E. Kinoshita, K. Ishikawa, E. Kinoshita-Kikuta, K. Ohtani, M. Shiro, and T. Koike*

Bull. Chem. Soc. Jpn., **78** (2005) 125–131



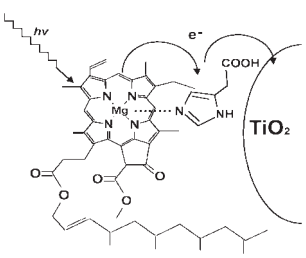
A novel dinuclear zinc(II) hexaazacryptate has been proven to be a phosphate capture molecule in aqueous solution. The dissociation constant for the phenyl phosphate complex is a small value of 0.6 μM at 35 °C.

■ **Short Article**

Visible-Light Sensitisation of Nanocrystalline TiO_2 Film by Mg Chlorophyll-*a* through the Axial Imidazole-4-acetic Acid Ligand

K. Aoki, Y. Takeuchi, and Y. Amao*

Bull. Chem. Soc. Jpn., **78** (2005) 132–134



A new photovoltaic conversion device based on the visible-light sensitisation of nanocrystalline TiO_2 film through the axial imidazole-4-acetic acid ligand of MgChl-*a* was developed.

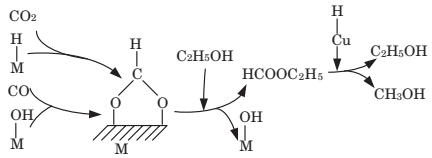
■ Short Article

In-Situ DRIFT Study of a New Low-Temperature Methanol Synthesis Mechanism

R. Yang, Y. Fu, Y. Zhang, B. Xu, and N. Tsubaki*

Bull. Chem. Soc. Jpn., **78** (2005) 135–137

The formation of ethyl formate is a key step in the low-temperature methanol synthesis reaction. The reaction temperature is significantly decreased due to promoting, catalytically active action of ethanol and a new reaction route.

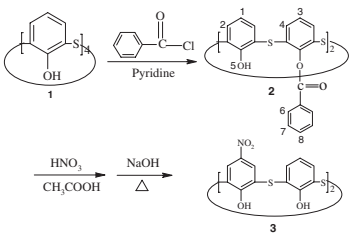


M is Cu/ZnO

Selective Nitration of Thiacalix[4]arene and an Investigation of Its Acid–Base Properties with a Chemometric Method

X. Hu, H. Shi, X. Shi,* Z. Zhu, Q. Sun, Y. Li, and H. Yang

Bull. Chem. Soc. Jpn., **78** (2005) 138–141

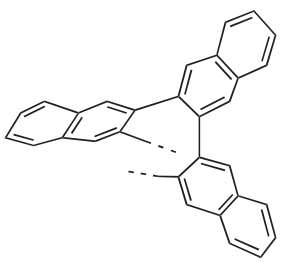


The selective dinitro-substituted derivative of thiacalix[4]arene was synthesized by a three-step route and characterized. Its acid–base properties in water solution were studied by UV–vis spectroscopy. Its four pK_a values were determined by Target Testing Factor Analysis (TTFA).

Synthesis and Structural Analysis of Oligo(naphthalene-2,3-diyl)s

T. Motomura, H. Nakamura, M. Suginome, M. Murakami, and Y. Ito*

Bull. Chem. Soc. Jpn., **78** (2005) 142–146



Oligo(naphthalene-2,3-diyl)s were synthesized and their structural studies in solution and in crystal provided a support to the conjecture that organic assemblies in which naphthalene-like aromatic units are linked together between the β-positions would have helical secondary structures.

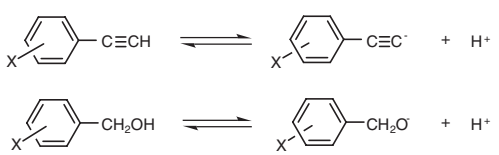
Selected Paper

Substituent Effects on the Gas Phase Acidity of Phenylacetylenes and Benzyl Alcohols

M. Matsuoka, Mustanir, Soe Than, and M. Mishima*

Bull. Chem. Soc. Jpn., **78** (2005) 147–153

The substituent effect on gas phase acidity of phenylacetylene is characterized to be a σ^o system like the acidities of benzyl alcohols and benzoic acids.

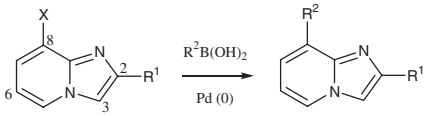


Evaluation of the 2-Substituent Effect on the Reactivity of the 8-Haloimidazo[1,2-*a*]pyridine Series towards Suzuki-Type Cross-Coupling Reaction

J.-Y. Kazock, C. Enguehard-Gueiffier, I. Théry, and A. Gueiffier*

Bull. Chem. Soc. Jpn., **78** (2005) 154–159

Conversely to the 3- and 6-positions of the imidazo[1,2-*a*]pyridine, the reactivity of which towards the Suzuki coupling reaction was influenced by the nature at R^1, no effect on the 8-position was noticed in this work.



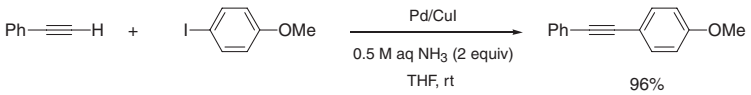
$R^1 = CH_3$, 4-FC_6H_4, $CO_2C_2H_5$

Aqueous Ammonia as a New Activator for Sonogashira Coupling

M. S. Mohamed Ahmed, A. Sekiguchi, K. Masui, and A. Mori*

Bull. Chem. Soc. Jpn., **78** (2005) 160–168

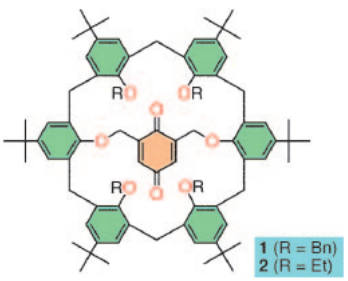
Selective carbonylative and non-carbonylative Sonogashira coupling of terminal alkynes took place by using two equivalents of 0.5 M aqueous ammonia at room temperature. Various high boiling-point water-soluble amines were used for the reaction at elevated temperatures.



Syntheses, Structures, and Properties of Quinone-Bridged Calix[6]arenes

S. Akine, K. Goto,* and T. Kawashima*

Bull. Chem. Soc. Jpn., **78** (2005) 169–179



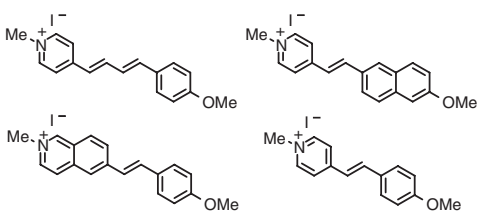
Quinone-bridged calix[6]arenes carrying a 1,4-benzoquinone moiety in the cavity of a calixarene macrocycle were synthesized. The relationship between the electrochemical properties and the structural features of these quinones as well as their chemical reactivities were elucidated.

Synthesis and Properties of Novel Stilbazolium Analogues as Second-Order Nonlinear Optical Chromophores

K. Tsuji, N. Nishimura, X.-M. Duan, S. Okada, H. Oikawa, H. Matsuda, and H. Nakanishi*

Bull. Chem. Soc. Jpn., **78** (2005) 180–186

The transition energies and second-order hyperpolarizabilities (β) were evaluated for the compounds in the illustration. Fused-ring systems were found to possess a large β irrespective of their relatively short absorption wavelengths, compared with the double-bond elongation system.

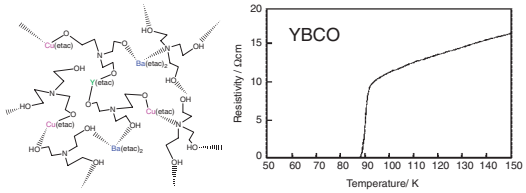


Preparation of YBCO and BSCCO Superconducting Thin Films by a New Chemical Precursor Method

T. Gunji,* M. Unno, K. Arimitsu, Y. Abe, N. Long, and A. Bubendorfer

Bull. Chem. Soc. Jpn., **78** (2005) 187–191

$YBa_2Cu_3O_{7-\delta}$ and $Bi_2SrCa_2Cu_2O_{8+y}$ thin films were prepared by the pyrolysis of their precursors. The critical temperature and the critical current density were 88.7 K and 5×10^5 A/cm^2 (at 77 K, 0 T) for YBCO and 77 K and 6×10^4 A/cm^2 (5 K) for BSCCO, respectively.



■ Short Article

Formation of Active Sites for the NO + CO Reaction over Palladium Catalysts Supported on Mesoporous Silica

A. Yamaguchi, T. Hayashi, K. Oyaizu, and M. Yuasa*

Bull. Chem. Soc. Jpn., **78** (2005) 192–194

Pd/MCM-41 after calcination in air showed very high catalytic activity for the NO + CO reaction because of formation of the Pd metal particles with an appropriate size for the reaction.