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A Report on the 29th Symposium on Heteroatom Chemistry of the Chemical Society of Japan

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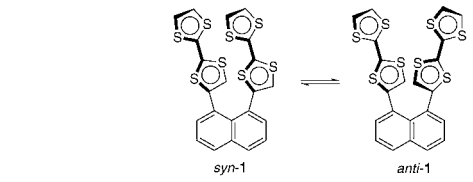
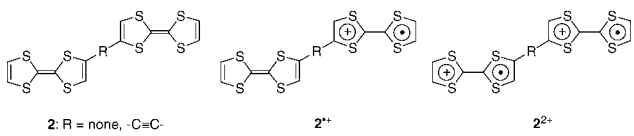
ABSTRACT: *The 29th domestic Chemical Society of Japan Symposium on Heteroatom Chemistry was held in Hiroshima during the period of December 12–14, 2002, under the management of Tetsuo Otsubo of Hiroshima University. About 250 chemists from various academic institutes and industries enjoyed four plenary lectures, 44 oral presentations, and 53 poster presentations.* © 2003 Wiley Periodicals, Inc. Heteroatom Chem 14:387–398, 2003; Published online in Wiley InterScience (www.interscience.wiley.com). DOI 10.1002/hc.10186

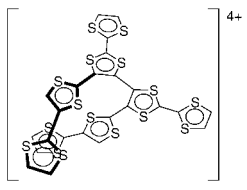
PLENARY LECTURES

The first plenary lecture was given by Masahiko Iyoda (Tokyo Metropolitan University) on "Supramolecular TTF Chemistry. A Development in Tetrathiafulvalene Oligomers." He presented molecules with tetrathiafulvalene (TTF) moieties exhibiting characteristic electrochemical properties, stacking, and self-assembly provided by intra- and intermolecular interaction of the TTF moieties.

He first showed the interaction of the two TTF moieties in **1** and **2** in the neutral, monocationic, dicationic, and tetracationic states. While **1** takes an anticonformation in the neutral state, the cation radical and dication of **1** take a syn conformation because of a stabilizing interaction between the TTF moieties. The cation radical $\mathbf{2}^{\bullet+}$ exhibits an absorption due to charge transfer in the electronic spectrum. The dication $\mathbf{2}^{2+}$ shows a Davydov long-wave shift in the electronic spectrum indicating a head-to-tail arrangement of the two cation radicals. He also found that the tetracation ($\mathbf{3}^{4+}$) of TTF tetramer forms a helical structure in solution because of the face-to-face interaction of the terminal TTF^{+} moieties.

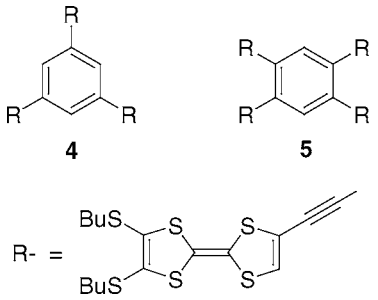






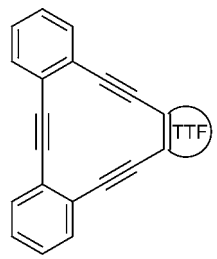
Correspondence to: Akihiko Ishii; e-mail: ishiiaki@chem.saitama-u.ac.jp.

He next showed the aggregation of star-shaped molecules, **4** and **5**. In solution, each forms a stacking, dimeric structure both in neutral and cationic states because of the cooperative interaction of three or four neutral TTF units or their cationic counterparts. The association constants (K_{assoc}) of **4** and **5** in the neutral state in $CDCl_3$ at 293 K are 1.6 and 8.2 M^{-1}, respectively. Cation radicals of **4** and **5** in the solid states exhibit electroconductivity.



4 **5**

The last topic of his lecture was on electrochemical properties, aggregation, self-assembly, and complexation with metals of TTF-fused hexadehydro[12]annulenes **6, 7**, and **8**. The π-extended TTFs show low oxidation potentials due to peripheral TTF moieties and relatively high reduction potentials due to central [12]annulene parts. Interestingly, formation of sandwich-type complexes, for example **9**, were proposed in the complexation of **6–8** with silver(I) on the basis of high-field shifts of benzene protons of the complexes derived from **6** and **7** in the ^1H NMR spectra.



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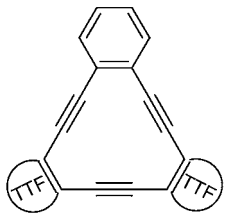

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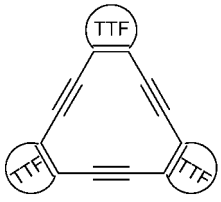

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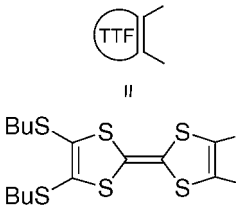

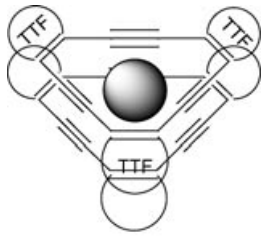

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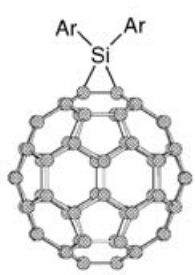
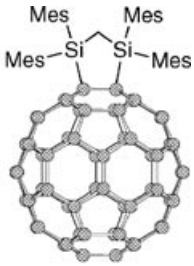
The second lecture was presented by Takeshi Akasaka (University of Tsukuba) on "Silylfullerenes." Fullerene is known as a good electron acceptor, while organosilicon compounds act as electron donors. He aimed at the creation of the chemistry of a new class of compounds by combination of fullerene and organosilicon compounds in the expectation that the resulting silylfullerenes have higher reduction and lower oxidation potentials than analogous carbon-substituted derivatives and the pristine fullerenes.

He first talked about silylation of C_{60} and higher fullerenes with silylene (Ar_2Si:), disilirane (disilacyclopropanes), and disilane. The addition of silylenes to C_{60} takes place at the 6,6-junction to furnish the silylated adduct **10** having a silacyclopropane ring. The reaction of disiliranes, which have high electron-donating property, with C_{60} needs photochemical activation of C_{60} to yield the adduct **11** in high yield. On the other hand, the addition of silyl radicals, generated by photolysis of disilanes, to C_{60} takes place at the 1,6-positions to give **12**. These silylfullerenes exhibit high electron-donating property.



Ar = 2,6-diisopropylphenyl

10



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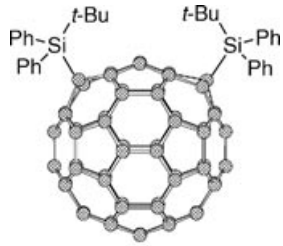
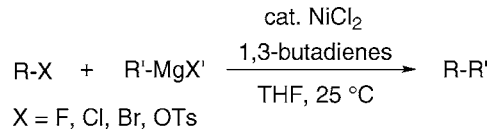


12

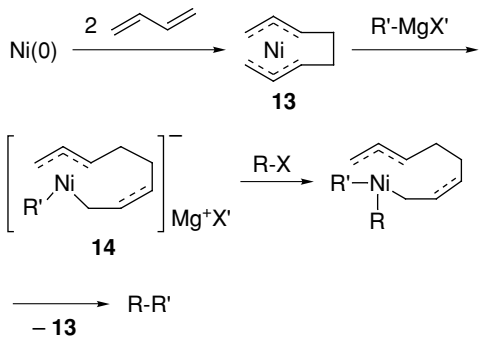
He next reported the silylation of endohedral metallofullerenes that are known to show characteristic reactivities due to an intramolecular electron transfer from the inner metal to the fullerene cage. He succeeded for the first time in the synthesis of an adduct of La@C_{82} with disiliranes (@ means a La atom is involved in the C_{82} cage). It has been clarified by him that the dynamic behavior of inner metals is controlled by distribution of static potential in the fullerene cage. He prepared the adduct of $La_2@C_{80}$ with disiliranes in the expectation that the dynamic behavior of the La atoms can be controlled by changing the distribution of static potential in the cage. This study may lead to the development of a molecular switch, a molecular memory, or a new device.

The third plenary lecture was entitled "Catalytic Reactions Using Alkyl Halides and Chlorosilanes: New Methodologies for Alkylation and Silylation," delivered by Nobuaki Kambe (Osaka University). He examined reactions using late transition metals with a diene and Grignard reagent to develop novel catalytic systems for construction of carbon–carbon and/or carbon–silicon bonds.

He first reported the cross-coupling reaction of R—X (X = F, Cl, Br, OTs) with R′-MgX′ in the presence of a catalytic amount of $NiCl_2$ and 1,3-butadienes as an additive [Eq. (1)]. It is noteworthy that alkyl fluorides can also undergo this coupling successfully, where the use of $CuCl_2$, instead of $NiCl_2$, improves the yield. Et_2Zn instead of R′-MgX′ is also available in a mixed solvent of THF and 1-methyl-2-pyrrolidinone (NMP). He proposed the mechanism involving the complex **14** as shown in Scheme 1.

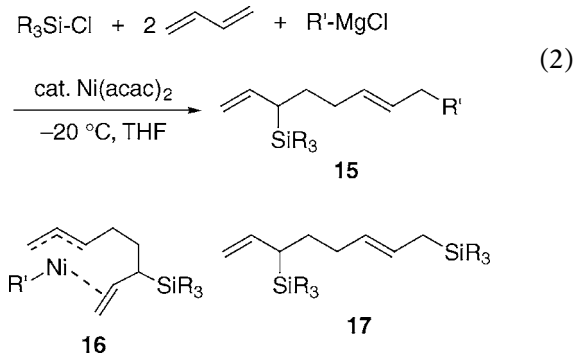


(1)

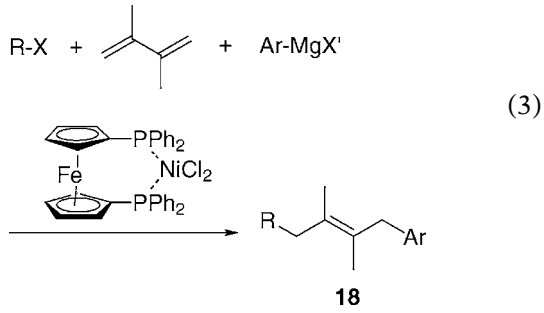


SCHEME 1 Cross-coupling catalyzed by Ni and butadiene.

The use of chlorosilanes instead of R—X led to three component coupling of dienes with chlorosilanes and R′-MgX′ to give 2:1:1 coupling products **15** regioselectively [Eq. (2)]. He proposed that **15** is produced by reductive elimination of Ni(0) from **16**, which is formed by reaction of **14** with chlorosilanes. Under similar conditions, a palladium catalyst, $Pd(acac)_2$, affords products **17** having two silyl groups at the 1- and 6-positions. When (dppf)$NiCl_2$ is used as the catalyst, addition of alkyl halide (R—X) and arylmagnesium halide (Ar-MgX′) takes place at 1- and 4-positions of 2,3-dimethyl-1,3-butadiene, respectively, to give adducts **18** [Eq. (3)]. This reaction also proceeds effectively when arylzinc halides are employed.



(2)

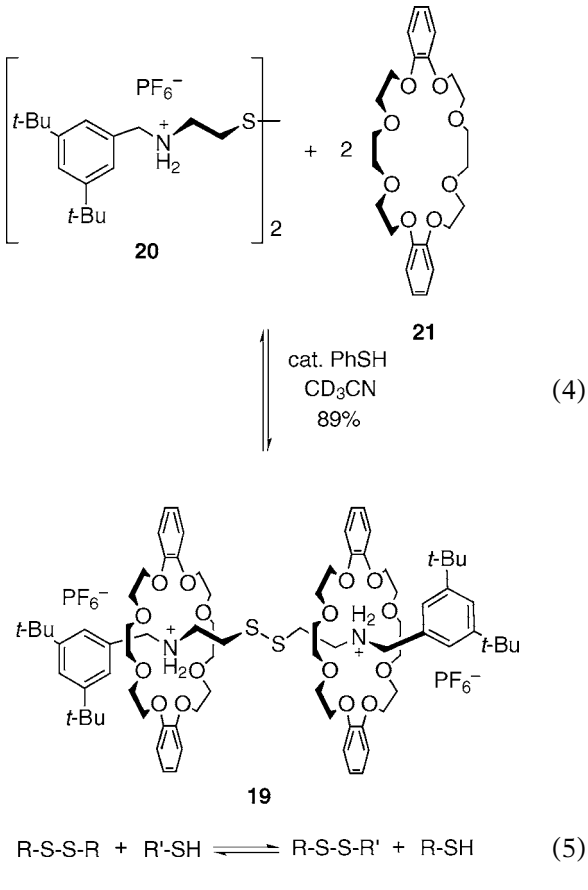


(3)

The last plenary lecture was given by Toshikazu Takata (Osaka Prefecture University), and the title of his presentation was "Construction and Application of Supramolecules by Utilizing Characteristic Nature of Sulfur Bonding—Mainly for Rotaxanes." He has recently succeeded in synthesizing supramolecules such as rotaxanes by utilizing the thiol-disulfide interchange reaction in high efficiency.

He first reported the synthesis of [3]rotaxane **19** having a disulfide bond at the center of the molecule by slipping disulfide **20** into crown ether **21** in the presence of a catalytic amount of benzenethiol [Eq. (4)]. This synthesis utilizes an equilibrium involving cleavage and reformation of the S—S bond

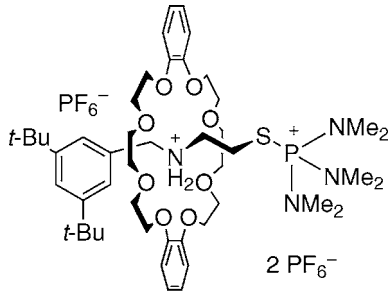
of disulfide induced by thiol [Eq. (5)]. This reaction is intrinsically an equilibrium reaction and strongly affected by temperatures, solvent polarity, and concentration. Thus, the formation of **19** is favorable under low temperatures, low polarity of the solvent, and high concentration conditions.



R-S-S-R + R'-SH ⇌ R-S-S-R' + R-SH (5)

He also succeeded in the synthesis of poly[3]-rotaxane **21** with $M_n = 30{,}000$ by the reaction of **20** with bifunctional crown ether **22** in a similar slipping manner.

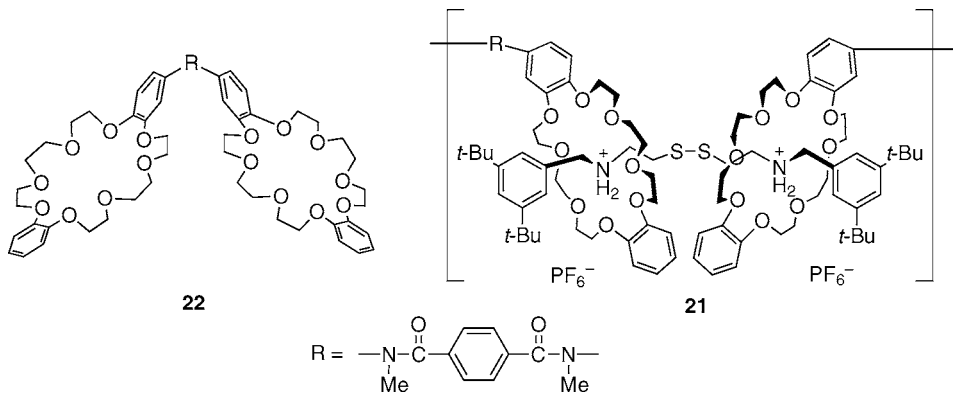
In the last part of the lecture, he mentioned a concept, "dynamic steric protection," in rotaxane. This concept is led by the idea that a reactive functional group on the axle can be sterically protected by translational and rotational motions of the mobile wheel unit. Based on this idea, [3]rotaxane **19** was allowed to react with $P(NMe_2)_3$ in dichloromethane at room temperature to afford [2]rotaxane **23** having thiophosphonium salt structure in 58% yield. Of course, the reaction of the axle **20** with $P(NMe_2)_3$ did not give the corresponding thiophosphonium salt.

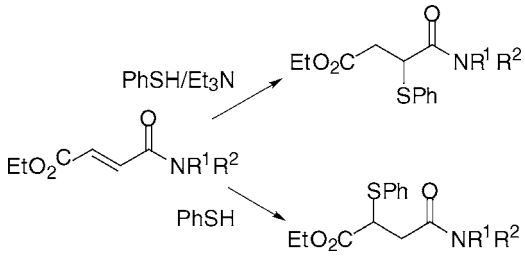


In addition to these stimulating plenary lectures, oral and poster presentations were given, where we had animated discussions. The topics and authors are listed below.

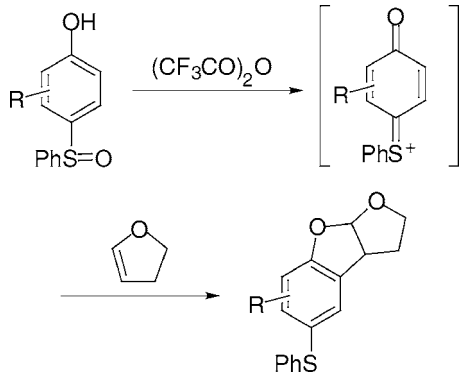
ORAL PRESENTATIONS

O01. "Regioselective Michael Addition to Unsymmetric Fumaric Acid Derivatives" by A. Kamimura, N. Murakami, and F. Kawahara (Yamaguchi University).

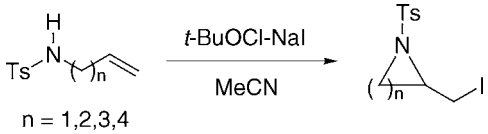




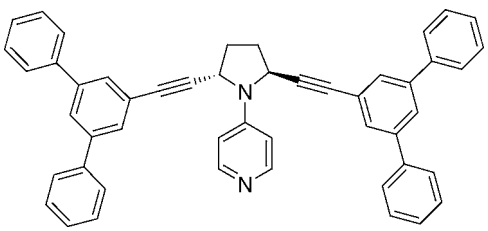
O02. "A New General Preparation of Diversely Substituted Benzofuranes Using Aromatic Pummerer-Type Reaction" by S. Akai, N. Morita, Y. Nakamura, N. Kawashita, K. Kakiguchi, I. Kuriwaki, and Y. Kita (Osaka University).



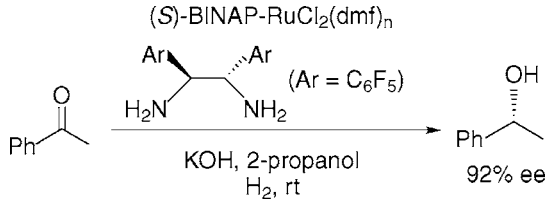
O03. "Synthesis of Heterocycles from *N*-Alkenylsulfonamides Using *t*-BuOCl-NaI System" by S. Minakata, Y. Morino, Y. Oderaotoshi, and M. Komatsu (Osaka University).



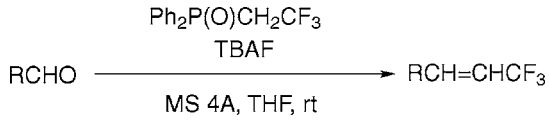
O04. "Design and Synthesis of C_2 Symmetric Chiral Pyrrolidine Derivatives and Their Application to the Asymmetric Catalysis" by N. Yasuda, Y. Ikki, G. Naraku, T. Hanamoto, H. Furuno, and J. Inanaga (Kyushu University).



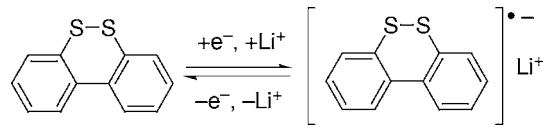
O05. "Synthesis and Application of Novel Chiral 1,2-Diaryl Compounds Bearing Pentafluorophenyl Group" by T. Korenaga, H. Mitsutomi, T. Ema, and T. Sakai (Okayama University).



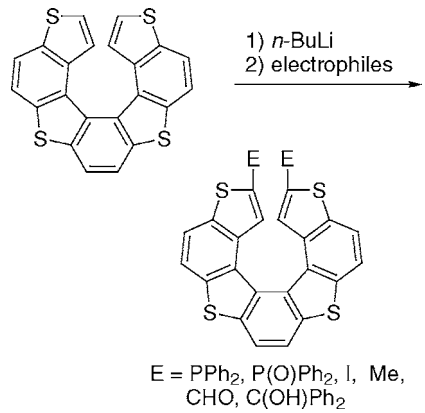
O06. "A Novel Synthesis of Trifluoromethylated Alkenes from Aldehydes Using Horner Reaction" by O. Tamura, T. Kobayashi, T. Eda, S. Yamamoto, and H. Ishibashi (Kanazawa University).



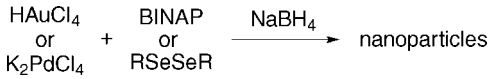
O07. "Electrochemical Properties of Aromatic [1,2]dithiins as Active Cathode Materials in Lithium Secondary Battery" by D. Yoshitoku, A. Izawa, T. Inamasu, H. Tani, and N. Ono (Ehime University; Yuasa Corp.).



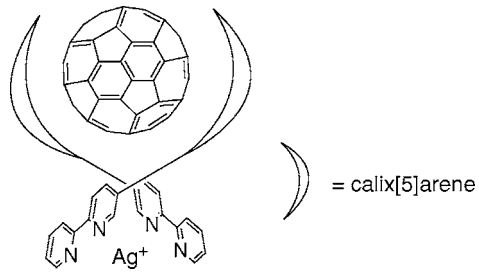
O08. "Synthesis of Difunctionalized [7]Thiaheterohelicenes by Regioselective Dilithiation" by H. Osuga, Y. Nakatsuji, T. Umano, K. M. Pietrusiewicz, and K. Tanaka (Wakayama University; Maria Curie-Sklodowska University).



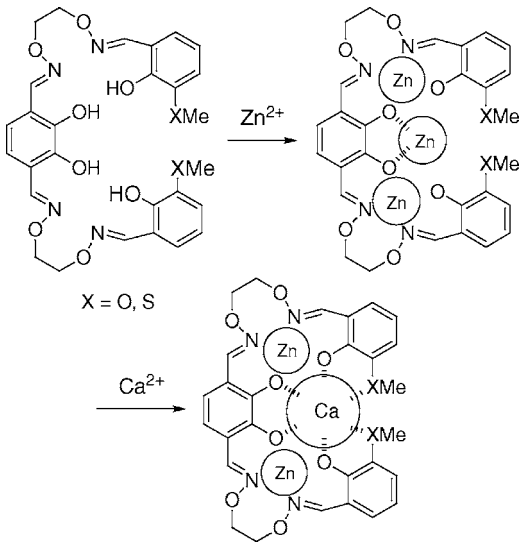
O09. "Synthesis and Property of Heteroatoms (P·Se) Protected Metal Nanoparticles" by A. Nagatsu, M. Tamura, and H. Fujihara (Kinki University).



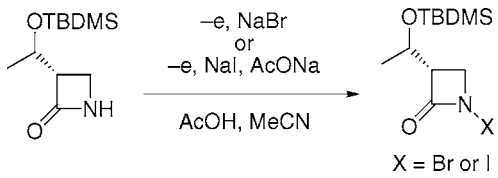
O10. "Development of Fullerene Receptors and Sensors Based on Calix[5]arene" by T. Haino, H. Mitsuhashi, H. Araki, Y. Yamanaka, Y. Fukazawa (Hiroshima University).



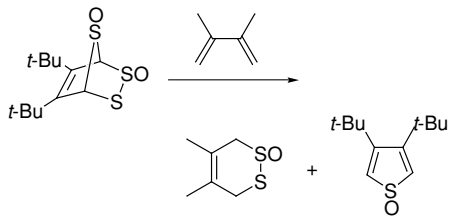
O11. "Ion Recognition of Linear Oligo(salicylaldoxime) Ligands by Utilizing the Character of Heteroatoms" by S. Akine, T. Taniguchi, and T. Nabeshima (University of Tsukuba).



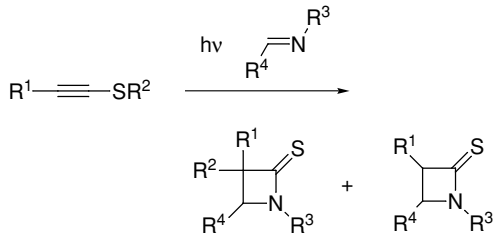
O12. "Electro-oxidative *N*-Halogenation of 2-Azetidinone Derivatives, and Reaction of *N*-Halo-2-azetidinones" by H. Tanaka, S. Arai, and M. Kuroboshi (Okayama University).



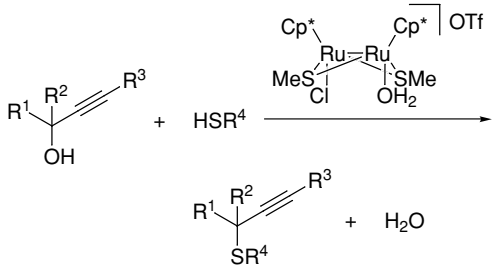
O13. "The Chemistry of 'S_2' and 'S_2O'; Synthesis and Reactions of 5,6-Di-*tert*-butyl-2,3,7-trithiabicyclo[2.2.1]hept-5-ene 7-Oxide" by S. Aoki, J. Takayama, Y. Sugihara, A. Ishii, and J. Nakayama (Saitama University).



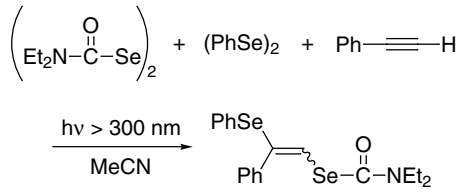
O14. "Photoreaction of Alkyl Alkynyl Sulfides" by S. Aoyagi, M. Souma, K. Shimada, and Y. Takikawa (Iwate University).



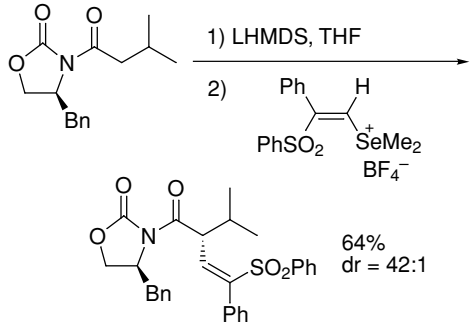
O15. "Ruthenium-Catalyzed Propargylic Substitution Reaction of Propargylic Alcohols with Thiols" by Y. Inada, Y. Nishibayashi, M. Hidai, and S. Uemura (Kyoto University; Science University of Tokyo).



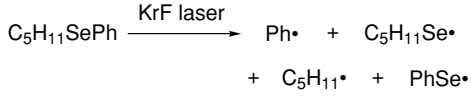
O16. "Reaction of Diorganyl Diselenide with Alkynes" by Y. Nishiyama, K. Kotani, F. Kinashi, and N. Sonoda (Kansai University).



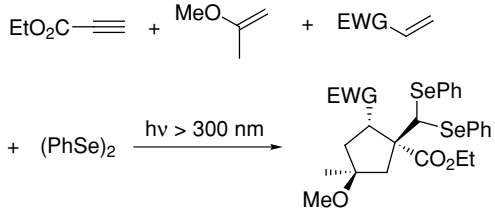
O17. "Development of Direct Alkynylation and Alkenylation of Enolates Using Selenonium Salt: Application to the Diastereoselective Alkenylation" by S. Watanabe, T. Ikeda, and T. Kataoka (Gifu Pharmaceutical University).



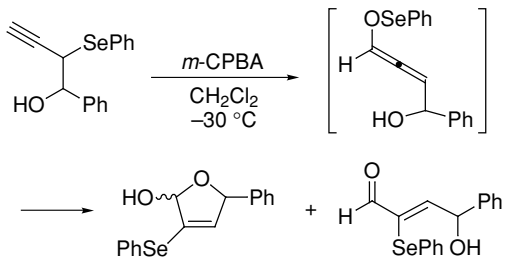
O18. "Solvent Effect on the Photochemical Cleavage of C–Se Bonds" by A. Ouchi, S. Liu, Z. Li, and S. A. Kumar (National Institute of Advanced Industrial Science and Technology).



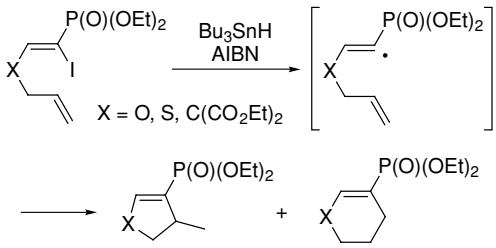
O19. "Development of Highly Selective Radical Addition Reactions Using Heteroatoms Mixed Systems" by K. Tsuchii and A. Ogawa (Nara Women's University).



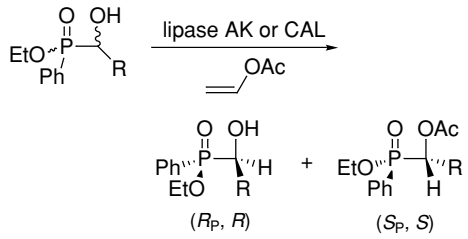
O20. "Synthetic Transformations via Oxidation of Phenyl Propargyl Selenide Derivatives" by I. Konishi, K. Takasaki, and M. Segi (Kanazawa University).



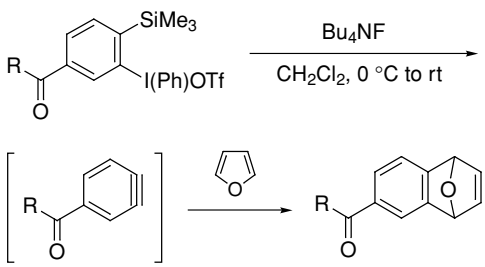
O21. "Generation of α-Phosphonovinyl Radicals and New Synthetic Application" by T. Ageno, T. Okauchi, and T. Minami (Kyushu Institute of Technology).



O22. "Synthesis and Utility of Optically Active Phosphine Oxides" by K. Shioji, T. Ueyama, A. Tashiro, and K. Okuma (Fukuoka University).

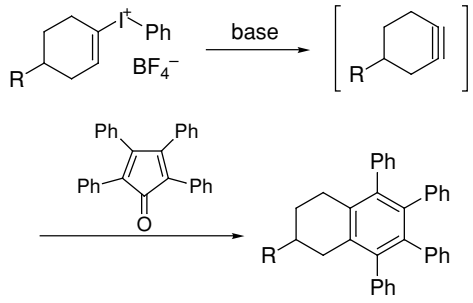


O23. "Efficient Generation of Benzynes Bearing Carbonyl Group from Hypervalent Iodine Compounds" by T. Kitamura, Y. Doi, S. Isshiki, K. Wasai, and Y. Fujiwara (Saga University).

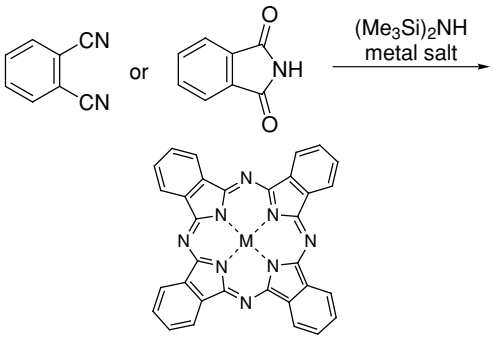


O24. "Formation of Cyclohexyne from Elimination Reaction of Cyclohexenyl Iodonium Salt" by

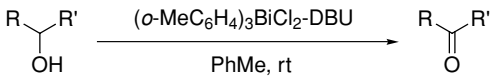
T. Okuyama, W. H. Kim, and M. Fujita (Himeji Institute of Technology).



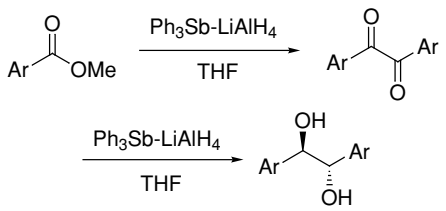
O25. "Novel Efficient Preparative Method for Phthalocyanines with HMDS" by H. Uchida, H. Tanaka, P. Y. Reddy, S. Nakamura, and T. Toru (Nagoya Institute of Technology).



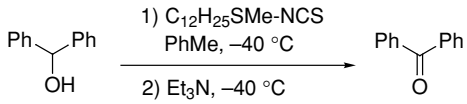
O26. "Facile Oxidation of Alcohols Using Triarylbismuth Dichlorides and DBU" by Y. Matano, H. Nomura, H. Yamada, and H. Imahori (Kyoto University).



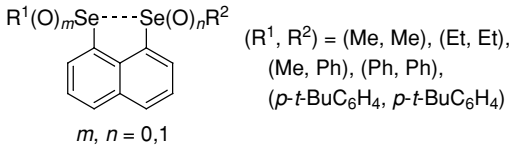
O27. "Triarylstibane-Lithium Aluminum Hydride as a New Reducing Reagent; Pinacol Coupling Reaction of Aryl Esters via Single Electron Transfer Process" by N. Kakusawa, A. Osada, and J. Kurita (Hokuriku University).



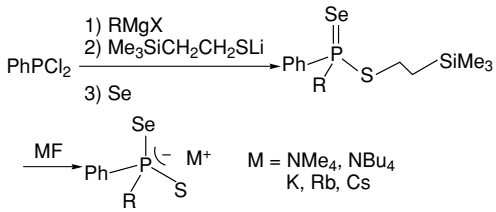
O28. "Development of Odorless Substitute for Dimethyl Sulfide" by K. Nishide, S. Ohsugi, M. Fudesaka, K. Kumar, and M. Node (Kyoto Pharmaceutical University).



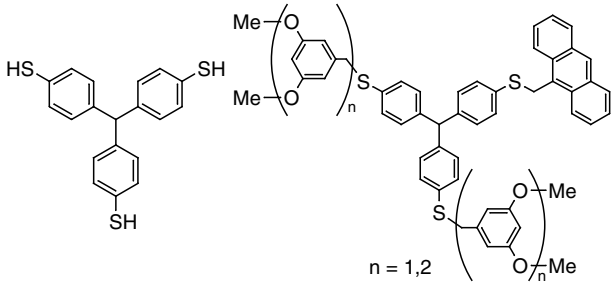
O29. "Nonbonded Se···Se, Se···Se(O), and Se(O)···Se(O) Interactions in Naphthalene 1,8-Positions" by W. Nakanishi, S. Hayashi, Y. Nakamura, A. Furuta, J. Drabowicz, and M. J. Potrzebowski (Wakayama University; Polish Academy of Science).



O30. "Synthesis and Characterization of Selenothiophosphinic Acids and Salts" by T. Kimura, T. Murai, A. Miwa, D. Kurachi, and S. Kato (Gifu University).

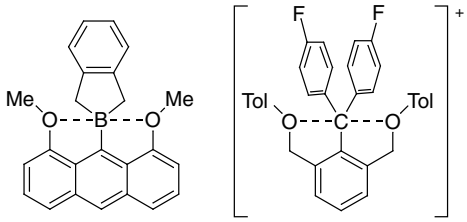


O31. "Synthesis and Characterization of Functional Molecules Derived from Tris(4-mercaptophenyl)methane" by R. Sato, T. Niida, S. Nakajyo, and S. Ogawa (Iwate University).

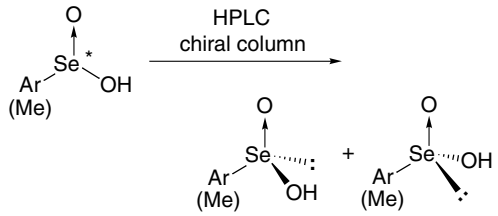


O32. "Topological Analysis of Electron Density Distributions of Hypervalent Heteroatom

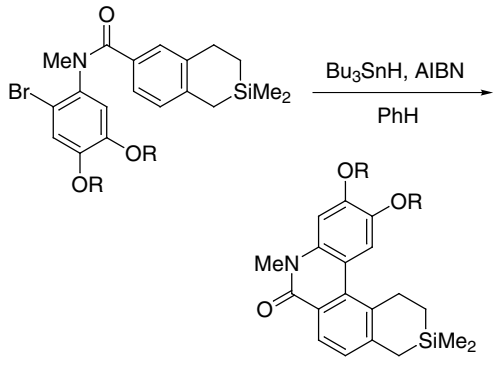
Compounds" by F. Iwasaki, D. Hashizume, M. Harakawa, M. Yasui, Y. Yamamoto, and K. Akiba (The University of Electro-Communications; Hiroshima University).



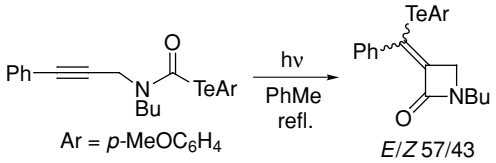
O33. "Optical Resolution and Stereochemistry of Areneseleninic Acids" by Y. Nakashima, T. Shimizu, I. Watanabe, K. Hirabayashi, M. Yasui, M. Nakazato, F. Iwasaki, and N. Kamigata (Tokyo Metropolitan University; The University of Electro-Communications).



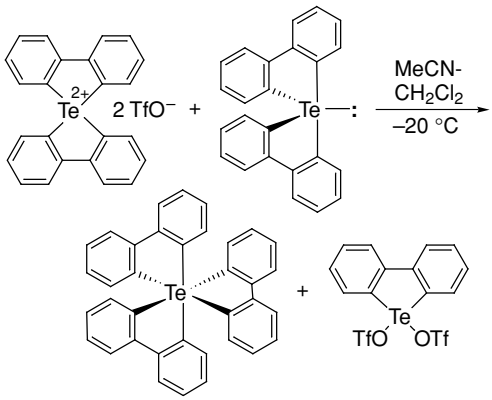
O34. "Synthesis of Phenanthridine Derivatives Bearing a Silacyclohexene Ring" by Y. Hoshino, H. Miwa, and O. Hoshino (Tokyo University of Science).



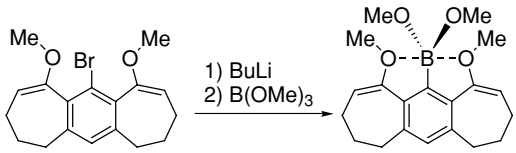
O35. "Generation of Carbamoyl Radicals via S_H2 Reaction on Tellurium Atom and Its Synthetic Application" by S. Fujiwara, T. Shin-ike, Y. Shimizu, Y. Imahori, N. Kambe (Osaka Dental University; Osaka University).



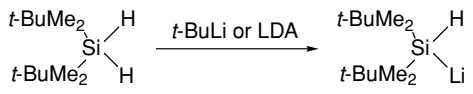
O36. "Reactivities of Telluranyl Dication Compound [8-Te-4(C4)]$^{2+}$ and New Generating Method of Hexaarylpertellurane [12-Te-6(C6)]" by S. Sato, T. Tanaka, E. Horn, and N. Furukawa (University of Tsukuba).



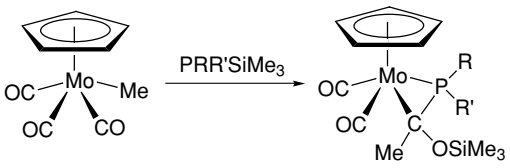
O37. "Synthesis of a Novel Tridentate Ligand System Bearing a Benzene Ring Condensed with Two Seven Membered Rings and Its Application" by T. Masui, A. Mitsu-ishi, Y. Yamamoto, and K. Akiba (Hiroshima University; Waseda University).



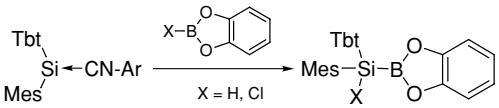
O38. "Synthesis, Structure and Reactions of Novel Hydridosilyllithiums via Sila-metalation" by T. Iwamoto, J. Okita, C. Kabuto, and M. Kira (Tohoku University).



O39. "Formation of Three-Membered Ring Complex with P-Si Bond Cleavage and P-C Bond Formation" by H. Nakazawa, T. Okahira, A. Takarada, and K. Miyoshi (Osaka City University, Hiroshima University).

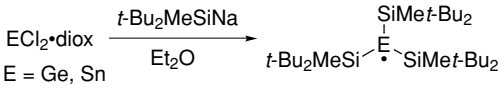


O40. "Syntheses of (Hydrosilyl)boranes and (Halosilyl)boranes Utilizing an Overcrowded Silylene and Their Properties" by T. Kajiwara, N. Takeda, and N. Tokitoh (Kyoto University).

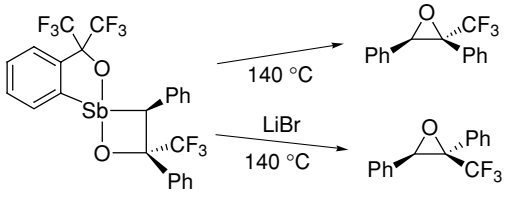


O41. "Synthesis of 1,3-Diphosphacyclobutenes by Reaction of Phosphaalkyne with Alkyllithiums" by H. Sugiyama, S. Ito, and M. Yoshifuji (Tohoku University).

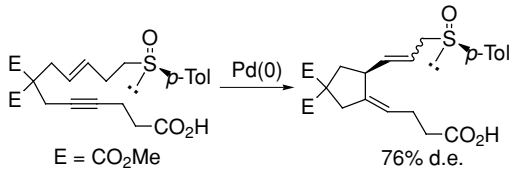
O42. "Acyclic Radicals of Heavier Group 14 Elements: Synthesis, Structure, and Reactivity" by T. Fukawa, M. Nakamoto, V. Y. Lee, M. Ichinohe, and A. Sekiguchi (University of Tsukuba).



O43. "Syntheses, Structures, and Reactivities of Pentacoordinate 1,2-Oxapnictogenetanes" by Y. Uchiyama, K. Kato, N. Kano, and T. Kawashima (The University of Tokyo).



O44. "Stereoelectronic Effects of Chiral Sulfoxide Functionality in Palladium-Catalyzed Asymmetric Cycloisomerization" by K. Yamasaki, T. Hirasawa, K. Watanabe, M. Koseki, and K. Hiroi (Tohoku Pharmaceutical University).



POSTER PRESENTATIONS

P01. "Factors Affecting the Reactivity of Thiyl Radicals" by M. Tada, T. Susuki, N. Sakurai, and E. Katayama (Waseda University).

P02. "Palladium-Catalyzed Thiocarbamoylation of Acetylene Using Sulfenamide and Carbon Monoxide" by T. Ohmori, H. Kuniyasu, H. Hiraike, M. Morita, H. Kurosawa, and N. Kambe (Osaka University).

P03. "Reaction of Thiocarbonyl Compounds Bearing Bulky Substituent with Propiolic Acid" by S. Maekawa, K. Shioji, and K. Okuma (Fukuoka University).

P04. "Novel Formation and Reaction of Zwitterion Products from 1,1-Disulfonyloxirane" by K. Ogura, K. Kimura, S. Matsumoto, and M. Akazome (Chiba University).

P05. "Syntheses, Isolation, and Structures of Two Configurational Isomers of 2-Oxide and 2-Sulfide of a 1,3,2-Dioxathiolane (Sulfite and Thiosulfite)" by S. Tanaka, A. Sakamoto, Y. Sugihara, A. Ishii, and J. Nakayama (Saitama University).

P06. "Synthesis and Reactivities of Thianthrene 'Dimer' Derivatives: Attempts to Synthesize Functional Thianthrene Derivatives" by H. Morita, T. Iwasawa, Y. Oida, T. Nakajima, and T. Ariga (Toyama University).

P07. "Study on the Synthesis of *Z*-α,β-Unsaturated Ketones" by T. Hidaka, A. Yamakawa, S. Kojima, and K. Okata (Hiroshima University).

P08. "Origin of the Face Selectivity on the Alkylation Reaction of the Meyers Enolate (Pyrrolidinone)" by Y. Ikuta and S. Tomoda (The University of Tokyo).

P09. "Kinetic Resolution of Racemic Ferrocenylphosphine Compounds Using Optically Active Cyclic Selenoxides as Oxidant" by A. Yamauchi, Y. Miyake, Y. Nishibayashi, and S. Uemura (Kyoto University).

P10. "Synthesis and Properties of Thio- and Selenoiminium Salts" by Y. Mutoh, Y. Ohta, T. Murai, and S. Kato (Gifu University).

P11. "New Method for the Generation of Nitrenoid by the Reaction of Isocyanate with Oxidants Containing Selenium" by K. Maeda, W. Kitagaito, Y. Nishiyama, and N. Sonoda (Kansai University).

P12. "TPDS-Mediated Free Radical Ring Expansion of α-Haloalkyl Cyclic β-Ketoesters" by M. Sugi, D. Sakuma, and H. Togo (Chiba University).

P13. "Silylation of Higher Fullerenes" by T. Wakahara, A. Han, T. Akasaka, Y. Maeda, M. Kako, M. Fujitsuka, O. Ito, K. Kobayashi, S. Nagase, and K. Yamamoto (University of Tsukuba; Tokyo Gakugei University; The University of Electro-Communications; Tohoku University; Institute for Molecular Science; Japan Nuclear Fuel Cyclic Development Institute).

P14. "Asymmetric Reactions of 3-Aryl-2-phosphonoacrylates Induced by the (−)-8-Phenylmenthyl Group as a Chiral Auxiliary" by S. Begum, R. Takagi, M. Hashizume, M. Nakamura, S. Kojima, and K. Ohkata (Hiroshima University).

P15. "An Efficient Synthesis of Phosphonoindoles" by A. Miyamoto, S. Maruyama, T. Okauchi, and T. Minami (Kyushu Institute of Technology).

P16. "Synthesis and Crystal Structures of Novel Copper Complexes Bearing an Organic λ^6-Sulfanenitrile as Ligand" by T. Yoshimura, T. Fujii, and H. Dai (Toyama University).

P17. "Synthesis of Transition Metal Chalcogenido Clusters Bearing Dithiadigermetanedichalcogenolate" by T. Matsumoto, Y. Matsui, M. Ito, and K. Tatsumi (Nagoya University).

P18. "Reaction of Cyclic Polysulfides with a Platinum(0) Complex: Syntheses and Properties of $Pt(PPh_3)_2(S_2O)$ and $Pt_2(PPh_3)_4(\mu\text{-}S)(\mu\text{-}SO)$" by M. Murata, A. Ishii, and J. Nakayama (Saitama University).

P19. "Novel Synthesis of Metallaphosphineboranes and Their Borane-Exchange Reactions" by I. Kanemitsu, K. Kubo, H. Nakazawa, T. Mizuta, and K. Miyoshi (Hiroshima University).

P20. "Syntheses and Structures of 1,2-Diphosphaacenaphthene and Its Transition Metal Complexes" by S. Kunikata, T. Mizuta, T. Nakazono, and K. Miyoshi (Hiroshima University).

P21. "Synthesis and Structure of (Tetraphosphorylcyclobutadiene)cobalt(I) Complex Possessing Chiral Centers on Phosphorus" by K. Kato, Y. Tanabe, S. Sasaki, and M. Yoshifuji (Tohoku University).

P22. "Synthesis of a Stable *O*-Thionitrosoalcohol Bearing a Bulky Bowl-Type Substituent" by K. Takenaka and R. Okazaki (Japan Women's University).

P23. "Isolation and Structural Property of Sulfur-Containing Reactive Intermediate by Utilizing 'Dynamic Steric Protection,'" by T. Takata, T. Oku, and Y. Furusho (Osaka Prefecture University).

P24. "Synthesis and Reaction of Sterically Congested 1,3,4-Selenadiazolines" by K. Kubo, K. Shioji, and K. Okuma (Fukuoka University).

P25. "Oxidation and Reduction of Bulky Silyl-Substituted Silyl Radical" by M. Nakamoto, T. Fukawa, V. Y. Lee, M. Ichinohe, and A. Sekiguchi (University of Tsukuba).

P26. "Synthesis and Properties of a Stable Dialkylsilanethione" by S. Ishida, T. Iwamoto, C. Kabuto, and M. Kira (Tohoku University).

P27. "Synthesis and Properties of Novel, Highly Strained Three-Membered-Ring Compounds Containing a Silicon, Bis(silacyclopropa)-benzenes" by T. Tajima, T. Sasaki, K. Hatano, N. Takeda, and N. Tokitoh (Kyoto University).

P28. "Synthesis, Structure and Reaction of the Germyl Radical with Bicyclo[4.1.0] Skeleton" by Y. Ishida and A. Sekiguchi (University of Tsukuba).

P29. "Synthesis and Property of Sb-Chiral Organoantimony Compounds Having Intramolecular Sb···N Interaction" by S. Yasuike, Y. Kishi, J. Kurita, and K. Yamaguchi (Hokuriku University; Chiba University).

P30. "Synthesis, Structure, and Reactivity of Organobismuth Compounds Substituted by Azulenyl Groups" by R. A. F. M. Mustafizur, K. Kurotobi, T. Murafuji, Y. Sugihara, and N. Azuma (Yamaguchi University).

P31. "Synthesis, Reaction, and Antibacterial Activity of Some Heterocyclic Organobismuth(III) Compounds" by H. Ohgaki, K. Mitsuhashi, N. Hayashi, and H. Suzuki (Kwansei Gakuin University).

P32. "Synthesis and Application of a Novel Tridentate Ligand Bearing a 1,1-Diphenyl-2,2,2-trifluoroethanol Framework" by S. Matsukawa, Y. Yamamoto, and K. Akiba (Hiroshima University; Waseda University).

P33. "Synthesis and Application of Novel

Tridentate Ligand Bearing 1,3-Bis(oxymethyl) Groups" by T. Nishii, Y. Moriyama, Y. Yamamoto, and K. Akiba (Hiroshima University; Waseda University).

P34. "Synthetic Study of Three-Membered Ring Compounds Bearing a Pentacoordinate Group 14 Element and an Oxygen Atom" by S. Goto, N. Kano, and T. Kawashima (The University of Tokyo).

P35. "Syntheses and Structures of Pentacoordinate Organophosphorus Compounds Bearing Two 8-Oxy-1-naphthyl Groups" by K. Kajiyama and T. Miyamoto (Kitasato University).

P36. "Development of a Novel Aromatic, Steric Protecting Group Bearing a Substituent at the para Position and Its Application to Low-Coordinate Phosphorus Compounds" by S. Kawasaki, K. Toyota, and M. Yoshifuji (Tohoku University).

P37. "Development of a Bulky Type of Chiral 2-Diphenylphosphino-9,10-dihydro-9,10-ethanoanthracene Bearing Carboxylic Acid Group" by Y. Okada, Y. Sawada, M. Ikejiri, M. Hiratoko, T. Miyamura, M. Nomura, and Y. Fujihara (Kinki University).

P38. "Structures of 1,8-Bis(chalcogena)naphthalenes: How do the Nonbonded Z—Z Interactions Determine the Structures?" by T. Arai, M. Uegaito, T. Nakai, D. Shimizu, S. Hayashi, and W. Nakanishi (Wakayama University).

P39. "Structure of 1,2-Bis(arylselanyl)benzenes: How does the Nonbonded Se—Se Interaction Determine the Structures?" by A. Tanioku, S. Hayashi, and W. Nakanishi (Wakayama University).

P40. "Synthesis and Binding Behaviors of Calix[4]-arene Receptor Having Hydrogen-Bonding Group" by M. Hiraoka, M. Nakamura, N. Kato, T. Haino, and Y. Fukazawa (Hiroshima University).

P41. "Synthesis and Binding Behavior of Bis-porphyrin Cleft Molecule" by M. Yamaguchi, H. Iwamoto, and Y. Fukazawa (Hiroshima University).

P42. "Synthesis of Polyalkylated Thiaheterohelicenes" by S. Nagai, H. Osuga, Y. Nakatani, and K. Tanaka (Wakayama University).

P43. "Synthesis and Properties of [6.6](1,8)Naphthalenophanes Containing Bithienyl Bridges" by K. Nakao, T. Kondo, M. Hasegawa, Y. Miyake, and M. Iyoda (Tokyo Metropolitan University).

P44. "Synthesis and Properties of Poly(tetrathiafulvalenylethynyl)benzene" by M. Hasegawa, J. Takano, Y. Kuwatani, and M. Iyoda (Tokyo Metropolitan University).

P45. "Structure and Properties of Single-Component Crystals of Extended π-Donors Bearing Long-Chain Alkylthio Groups" by S. Kimura, M. Ashizawa, H. Kurai, and T. Mori (Tokyo Institute of Technology).

P46. "Synthesis and Properties of Novel π-Extended Donors Bearing Crown Ether Rings" by K. Sako, H. Oku, H. Tatemitsu, Y. Misaki, and K. Tanaka (Nagoya Institute of Technology; Kyoto University).

P47. "Synthesis and Properties of Extended TTP Dimers" by T. Yamanaka, Y. Maeda, H. Fueno, Y. Misaki, and K. Tanaka (Kyoto University).

P48. "Synthesis of Higher Homologs of Extended TTP Systems" by A. Kubo, Y. Misaki, and K. Tanaka (Kyoto University).

P49. "Synthesis and Properties of New TTP Donors Composed of Extended TTF" by Y. Misaki, S. Watanabe, A. Kubo, H. Fueno, and K. Tanaka (Kyoto University).

P50. "Synthesis of Alkylenedithio-tetraselenafulvalene Analogs via Trans-alkylation Reaction on Sulfur Atom" by N. Niihara, Y. Kataoka, K. Takimiya, Y. Aso, and T. Otsubo (Hiroshima University).

P51. "Synthesis and Properties of Bis(ethylenedioxy)thiophene, -selenophene, and Their Related Compounds" by R. Watanabe, Y. Miyake, Y. Kuwatani, M. Yoshida, and M. Iyoda (Tokyo Metropolitan University).

P52. "Construction and Performance of EL Devices Having Poly(3-hexylthiophene)s with Different Regioregularity as Hole-Transport" by Y. Tada, J. Ohshita, A. Kunai, Y. Harima, Y. Kunugi, and K. Yamashita (Hiroshima University; Kyushu University).

P53. "Characterization of Photovoltaic Devices Based on a Photoinduced Intramolecular Electron-Transfer from Oligothiophene to Fullerene" by N. Negishi, K. Yamada, K. Takimiya, Y. Aso, T. Otsubo, and Y. Harima (Hiroshima University).

We look forward to the 30th Symposium on Heteroatom Chemistry to be held in December of 2003 in Toyama and to be organized by Toshiaki Yoshimura of Toyama University. We hope that many chemists from various academic institutes and industries will participate in this Symposium.