

SCIENCE BULLETIN OF JOSAI UNIVERSITY

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SCIENCE BULLETIN OF JOSAI UNIVERSITY

城西大学理学部研究報告

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CONTENTS

PART I ANNUAL REPORTS

1. Abstracts of Papers Published in Journals	3
Mathematics	3
Physics	4
Chemistry.....	4
Physical Education	11
2. Books, Reviews and Other Printings	12
Mathematics	12
Chemistry.....	12
Biology	13
Earth Science	13
Physical Education	14
3. Oral Presentations.....	15
Mathematics	15
Chemistry.....	15
Earth Science	20
Physical Education	21



PART I ANNUAL REPORTS

1. Abstracts of Papers Published in Journals

MATHEMATICS

Nonregular 2-Simple Prehomogeneous Vector Spaces of Type I and Their relative Invariants

Takeyoshi Kogiso, Go Miyabe*, Miyuki Kobayashi* and Tatsuo Kimura* (* Institute of Mathematics, University of Tsukuba)

Journal of Algebra **251** (2002), No.1, 27–69

After the fundamental theorem for nonregular reductive prehomogeneous vector spaces was proved by A. Gyoja, the construction of the theory of nonregular prehomogeneous vector spaces, became as interesting problem. However, only $(Sp_n \times GL_2, A_1 \otimes 2A_1, M(2n, 3))$ is known as an interesting example of nonregular reductive prehomogeneous vector spaces. In this paper, we give some other interesting examples by constructing all relative invariants of nonregular 2-simple prehomogeneous vector spaces of type I.

Construction of irreducible relative invariant of the prehomogeneous vector space $(SL_5 \times GL_4, A^2(\mathbf{C}^5) \otimes \mathbf{C}^4)$

Katsutoshi Amano*, Masaki Fujigami* and Takeyoshi Kogiso (* Institute of Mathematics, University of Tsukuba)

Linear Algebra Appl. **355** (2002), 215–222.

In this paper, we explicitly construct the irreducible relative invariant of the prehomogeneous vector space $(SL_5 \times GL_4, A^2(\mathbf{C}^5) \otimes \mathbf{C}^4)$. This prehomogeneous vector space has been known as the most difficult case in irreducible prehomogeneous vector spaces.

Relative invariants of some 2-simple prehomogeneous vector spaces

Takeyoshi Kogiso, Go Miyabe*, Miyuki Kobayashi* and Tatsuo Kimura* (* Institute of Mathematics, University of Tsukuba)

Math. Comp. **72** (2003), No.242, 865–889

In this paper, we construct explicitly irreducible relative invariants of 2-simple prehomogeneous vector spaces. Together with a preprint by the same authors, this completes the list of all relative invariants of regular 2-simple prehomogeneous vector spaces of type I.

Asymptotic behavior of solutions for nonlinear diffusion equations

Toshiko Ogiwara and Ken-ichi Nakamura* (* Department of Computer Science, University of Electro-Communications)

Proceedings of the Second International Conference on Nonlinear Analysis and Convex Analysis, 363–372 (2002)

We study the existence, uniqueness and asymptotic stability of a growing-up solution with time-periodic profile for a reaction-diffusion equation that is related to a model of spiral crystal growth. In order to prove these results we establish the existence theorem of a stable monotone orbit in a general framework of order-preserving dynamical systems.

PHYSICS

Measurements of State-selective Differential Cross Sections for the One-electron Capture Process in the O^{2+} –He System at $E_{\text{lab}} = 30, 40$ and 50 eV

Yoh Itoh

J. Phys. B: At. Mol. Opt. Phys. **35**, 3217–3225 (2002)

A crossed-beam apparatus was used to measure the relative differential cross sections for $O^{2+}(2s^2 2p^2 \ ^3P) + He(1s^2 \ ^1S) \rightarrow O^+(2s^2 2p^3 \ ^2P) + He^+(1s \ ^2S) + 5.52$ eV, below $E_{\text{lab}} = 50$ eV. The significant undulations observed in the differential cross sections are interpreted qualitatively by a two-state model (Olson, R. E. and Kimura, M. 1982, *J. Phys. B: At. Mol. Phys.* **15**, 4231) as due to the ‘inelastic rainbow’ effect and the quantum mechanical interference effect, Stückelberg oscillation.

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CHEMISTRY

Photocatalyzed *N*-demethylation and Degradation of Methylene Blue Titania Dispersions Exposed to Concentrated Sunlight

Tianyong Zhang^{*1}, Toshiyuki Oyama, Satoshi Horikoshi^{*1}, Jincal Zhao^{*2}, Hisao Hidaka^{*1}, and Nick Serpone^{*3} (*1 Frontier Research Center for the Global Environmental Protection, Meisei University, *2 Institute of Chemistry, Chinese Academy of Sciences, *3 Department of Chemistry and Biochemistry, Concordia University)

Solar Energy Materials and Solar Cells **73**, 287–303 (2002)

Simulated wastewaters that contain methylene blue (MB) were bleached in a photo-

catalytic aqueous TiO₂ dispersion illuminated by concentrated sunlight using a parabolic round concentrator (PRCR). The kinetic analysis was carried out well when the temporal concentration variation as a function of the concentrated light energy irradiated. The photocatalyzed *N*-demethylation of MB takes place concurrently with photocatalytic decomposition of MB by pseudo-first-order kinetics. The dependence of the photodecomposition kinetics on the initial concentration of MB is consistent with the Langmuir-Hinshelwood model. Elimination of TOC (total organic carbon) also occurs by pseudo-first-order kinetics prior to full bleaching of the aqueous TiO₂ dispersion, after which the TOC level decreases only slightly. Also, compared with the open to air, the photodegradation of MB is not influenced by molecular oxygen bubbling continuously through the reactant suspensions during illumination. TiO₂ loadings and flow rates markedly affect the degradation of MB. Under concentrated sunlight, the relative photonic efficiency of MB photodegradation is $\xi_{\text{rel}} = 0.49$ (relative to phenol). The efficiency for the degradation of MB is independent of photoreactor geometry (cylindrical bottle reactor versus round-bottomed flask), of light sources (solar light concentrator versus a Hg lamp) and of the operating mode used (flow versus batch operation).

Synthesis of Heterocycle-Annulated Azulenequinone Derivatives

H. Wakabayashi, S. Matsumaru, T. Kurihara, and M. Yasunami* (* Department of Industrial Chemistry, Faculty of Engineering, Nihon University)

Heterocycles, **56**, 73–80 (2002)

Treatment of 2-methoxyazulene with 4.2 equivalents of bromine in aqueous tetrahydrofuran (THF) at 0°C for 1 h afforded 3-bromo-2-methoxy-1,5- (**1a**) and -1,7-azulenequinone (**1b**) in a 16 : 1 ratio. Reaction of **1a** with *o*-aminobenzenethiols gave 12 *H*-azuleno [1,2-*b*] benzo [*e*] [1,4] thiazine-7,11-dione derivatives (**6a**, **b**). The electronic spectra of 1,5-azulenequinones showed the longest wavelength band centered at 450nm, while those in the **6a** and **6b** are shown bathochromic shift and similar to that of 1,2-azulenequinone.

Cancer Prevention and Therapy with Kiwifruit in Chinese Folklore Medicine: A Study of Kiwifruit Extracts

N. Motohashi*¹, Y. Shirataki*², M. Kawase*², S. Tani*², H. Sakagami*³, K. Satoh*⁴, T. Kurihara, H. Nakashima*⁵, I. Mucsi*⁶, A. Varga*⁷, J. Molnar*⁶ (*¹ Meiji Pharmaceutical University, *² Faculty of Pharmaceutical Sciences, Josai University, *³ Department of Dental Pharmacology, Meikai University School of Dentistry, *⁴ Analysis Center, School of Pharmaceutical Sciences, Showa University, *⁵ Department of Microbiology and Immunology, Kagoshima University Dental School, *⁶ Institute of Microbiology, Albert Szent-Gyorgyi Medical University, *⁷ Department of Molecular Parasitology, Humboldt University)

Journal of Ethnopharmacology, **81**, 357–364 (2002)

Gold kiwifruits were extracted successively with hexane, acetone, methanol and 70% methanol, and further fractionated by silica gel and ODS column chromatographies for the assays of various biological activities such as antimicrobial activity and cytotoxic activity. Five fractions **H1**, **H2** (hexane extract), **A1**, **A2** (acetone extract) and **M2** (methanol extract) showed selective cytotoxic activity against human oral tumor cell lines, which was more sensitive than human gingival fibroblasts. Hydrophilic fractions [**70M3**, **70M4**, **70M5**] of 70% methanol extract displayed higher anti-HIV activity, radical generation and O_2^- scavenging activity. The antibacterial activity of 70% methanol extracts was generally lower than that of more lipophilic fractions, although each fraction did not show any specific antimicrobial action. All fractions were inactive against *Helicobacter pylori*. These results demonstrate that gold kiwifruit extracts contain valuable, various bioactive materials, which can be separated with each other.

Lewis-Base Adducts of Lead(II) Compounds, XXI. Revisitations: Synthesis and Structure of the Hydrated 1:2 Adduct of Lead(II) Bis(perchlorate) and 2,4,6-Tris(2-pyridyl)-1,3,5-triazine and a Low-Temperature Redetermination of the Structure of Bis(2-aminomethylpyridine)lead(II) Bis(perchlorate)

J. M. Harrowfield*¹, H. Miyamae, B. W. Skelton*¹, A. A. Soudi*^{1,2} and A. H. White*¹ (*1 Department of Chemistry, University of Western Australia, *2 Department of Chemistry, Zanjan University, Iran)

Aust. J. Chem. **2002**, 55, 661–666

Lead(II) perchlorate crystallizes from aqueous ethanol with 2,4,6-tris(2-pyridyl)-1,3,5-triazine(trz) as a 1:2 trihydrate adduct, $[(\text{trz})_2\text{Pb}(\text{OH}_2)(\text{O}_2\text{ClO}_2)]\text{ClO}_4 \cdot 2\text{H}_2\text{O}$, as has been confirmed by a low temperature (*ca.* 153K) single crystal X-ray structure determination. The lead(II) environment is derivative of that of the previously recorded hydrated (rather than the methanol solvated) nitrate complex, comprising a pair of tridentate trz ligands, and, in place of the pair of bidentate nitrates, a unidentate water and an unsymmetrically bidentate perchlorate ion. A redetermination of the structure of bis(2-aminomethylpyridine)lead(II) bis(perchlorate) has resulted in a nondisordered model, still based upon the $[\text{Pb}(\text{amp})_2(\text{OClO}_3)_2]$ entity, where amp=2-aminomethylpyridine, but with eight independent molecules, devoid of any crystallographic symmetry, comprising the asymmetric unit of the structure, which is described in a larger unit cell of lower symmetry.

The stable inner salt 2,2-dimorpholino-2-ethylium-1-dithoate

Takashi Fujihara*¹, Takeshi Ohba*¹, Akira Nagasawa*^{1,3}, Juzo Nakayama*¹, Kenji Yoza*² (*1 Department of Chemistry, Saitama University, *2 Bruker AXS K.K., *3 Lecturer)

Acta Crystallogr., **c58**, 0558–0559 (2002)

The title compound, $(\text{C}_4\text{H}_8\text{NO})_2\text{CCS}_2$, is considered to maintain an inner-salt structure

in the crystal, where the planes of the carbenium and the thiocarboxylate moieties are nearly perpendicular to each other (77 deg), and the backbone C–C bond length (N₂C–CS₂, 1.510 Å) is significantly shorter than that of the common C–C single bond.

Rhenium(I) carbonyl complexes of bis (*N,N'*-diethylamino) carbeniumdithiocarboxylate, a novel inner-salt type sulfur donor ligand. Spectroscopic and structural studies

Sangeeta Ray Banerjee*¹, Akira Nagasawa*^{2,3}, Jon Zubieta*¹ (*1 Syracuse University, U.S.A. *2 Saitama University, *3 Lecturer)

Inorg. Chim. Acta, **340**, 155–162 (2002)

The reaction of the inner-salt SS donor ligand, bis (*N,N*-diethylamino)carbenium-dithiocarboxylate, Et₄L, with [Re(CO)₅Cl] afforded a red colored dinuclear rhenium(I) complex, [Re₂(CO)₆(μ-Cl)₂(μ-Et₄L)] in excellent yield, along with the mononuclear complex [Re(CO)₃(Et₄L)Cl]. The corresponding reactions of the ligand with [Re(CO)₅Br] give only the mononuclear analogue, [Re(CO)₃(Et₄L)Br]. All the complexes are structurally characterized. The X-ray structure of the dinuclear complex revealed that two facially coordinated {Re(CO)₃}⁺ chelated by the novel inner-salt type sulfur donor ligand and are bridged by two chloride ligands. The Re–CO bonds, *trans* to the S donors of the ligand are longer than the other Re–CO bonds, evidently due to the strong *trans* influence of the ligand. IR and ¹H and ¹³C NMR data indicate that all the complexes are substantially stable in solution. The dinuclear complex displays metal based and ligand based quasi-reversible oxidation and reduction couples, respectively, whereas the mononuclear complexes are unstable under the same electrochemical conditions.

Effects of Prenylflavanones from *Sophora* Species on Growth and Activation of Mouse Macrophage-like Cell Line

M. Tashiro*¹, F. Suzuki*¹, Y. Shirataki*², Y. Yokote, K. Akahane, N. Motohashi*³, M. Ishihara*⁴, Y. Jiang*⁵ and H. Sakagami*^{1,5} (*1 Department of Dental Pharmacology, *2 Faculty of Pharmaceutical Sciences, *3 Meiji Pharmaceutical University, *4 Department of Chemistry, Meikai University School of Dentistry, *5 Meikai Pharmaco-Medical Laboratory (MPL) Meikai University School of Dentistry)

Anticancer Research, **22**, 53–58 (2002)

We investigated the effect of 2 flavanones and 8 chemically-defined prenylflavanones on the growth and activation of mouse macrophage-like Raw 264.7 cells. Amino acid analysis in the culture medium demonstrated the rapid consumption of serine and glutamine by Raw 264.7 cells, suggesting the necessity to supplement these amino acids for the prolonged culture. Naringenin and hesperetin showed little or no cytotoxic activity. However, addition of the isoprenyl group (sophoraflavanone B, euchrestaflavanone A) or the lavandulyl and hydroxyl group (sophoraflavanone G) significantly enhanced the

cytotoxic activity. The cytotoxic activity of these compounds was significantly influenced by both log P value and ionization potential. These compounds slightly, but significantly, reduced both nitric oxide (NO) and tumor necrosis factor (TNF) production by lipopolysaccharide (LPS)-stimulated Raw 264.7 cells, regardless of their cytotoxic activity. These data suggest that the macrophage inhibitory effect of prenylflavanones might not be related to their cytotoxic activity.

Stimulation of Arginine Consumption and Asparagine Production in LPS-activated Macrophages

F. Suzuki*, M. Tashiro*, Y. Yokote, K. Akahane, H. Sakagami* (* Department of Dental Pharmacology, Meikai University School of Dentistry)

Anticancer Research, **22**, 203–210 (2002)

Changes in amino acid utilization during lipopolysaccharide (LPS)-induced activation of mouse macrophage-like cells Raw 264.7 were extracted by 5% trichloroacetic acid and quantitated by amino acid analyzer. Glutamine was utilized by cells at the highest rate, followed by serine and arginine, a precursor of nitric oxide (NO). When Raw 264.7 cells were incubated with 10 or 100 ng/mL LPS, the consumption of arginine and the production of citrulline, nitric oxide (NO) and asparagine were significantly increased. The intracellular amino acid concentration was not significantly changed. These data suggest that arginine consumption and asparagine production might be possible markers of macrophage activation.

Effects of Isoflavanones from *Sophora* Species on Growth and Activation of Mouse Macrophage-like Cell Line

M. Tashiro*¹, F. Suzuki*¹, Y. Shirataki*², Y. Yokote, K. Akahane, N. Motohashi*³, M. Ishihara*⁴, K. Satoh*⁶ and H. Sakagami*^{1,5} (*¹ Department of Dental Pharmacology, *² Faculty of Pharmaceutical Sciences, *³ Meiji Pharmaceutical University, *⁴ Department of Chemistry Meikai University School of Dentistry, *⁵ Meikai Pharmaco-Medical Laboratory (MPL), Meikai University School of Dentistry, *⁶ Medical Information, School of Pharmaceutical Sciences, Showa University)

Anticancer Research, **22**, 2185–2192 (2002)

We investigated the effect of eleven isoflavones of the growth and activation of mouse macrophage-like Raw 264.7 cells. The study of structure-activity relationship suggests that both hydrophilic (hydroxyl) and hydrophobic (prenyl) groups within isoflavone molecules are the determinants for the induction of cytotoxic activity. When hydrophobicity was assessed by octanol-water partition coefficient (log P), the maximum cytotoxic activity was observed at a log P value above 2.5. All isoflavones did not significantly simulate the nitric oxide (NO) production by Raw 264.7 cells, but reduced the NO production by

lipopolysaccharide (LPS)-stimulated Raw 264.7 cells, at cytotoxic concentrations. Amino acid analysis in the culture medium demonstrated that isoflavones significantly inhibited the LPS-stimulated production of citrulline and asparagine. Isoflavones inhibited the LPS-stimulated NO production more efficiently than citrulline and asparagine production possibly due to their NO scavenging activity. These data suggest that the inhibition of LPS action by isoflavones may be coupled with their cytotoxic activity.

Effect of Lignins and their Precursors on Nitric Oxide, Citrulline and Asparagine Production by Mouse Macrophage-like Raw 264.7 Cells

F. Suzuki*¹, H. Okayasu*¹, M. Tashiro*¹, K. Hashimoto*¹, Y. Yokote, K. Akahane, S. Hongo*² and H. Sakagami*¹ (*1 Department of Dental Pharmacology, Meikai University School of Dentistry, *2 Department of Biochemistry, Showa University School of Medicine)
Anticancer Research, **22**, 2719–2724 (2002)

Lignins, tannins and flavonoids are commonly found polyphenols. Among these polyphenols, lignins, polymers of phenylpropanoids complexed with polysaccharides, were the least cytotoxic and most portently stimulated the production of nitric oxide (NO), citrulline and asparagine by mouse macrophage-like Raw 264.7 cells. The maximum production of these substances reached the level attained by lipopolysaccharide (LPS). However, epigallocatechin gallate, phenylpropanoid monomers (ferulic acid, caffeic acid) and gallic acid (component unit of tannin) were inactive. These data suggest that the macrophage-stimulation activity of polyphenols depends, at least in part, on their molecular weight or structural configuration. There was a positive relationship between the extent of asparagine production and that of NO or citrulline. Western blot analysis demonstrated that both lignins and LPS elevated the cellular level of asparagine synthetase. The present study suggests the possible link between the stimulated asparagine production and macrophage activation.

Effect of Poly-Herbal Formula on NO Production by LPS-stimulated Mouse Macrophage-like Cells

M. Miyamoto*¹, K. Hashimoto*¹, K. Minagawa*², K. Satoh*^{1,3}, N. Komatsu*⁴, M. Fujimaki*⁴, H. Nakashima*⁵, Y. Yokote, K. Akahane, M. Gupta*⁶, D.N.K. Sarma*⁶, S.K. Mitra*⁶ and H. Sakagami*¹ (*1 Department of Dental Pharmacology, Meikai University School of Dentistry, *2 Pediatrics, Meikai University School of Dentistry, *3 Medical Information, School of Pharmaceutical Sciences, Showa University School of Medicine, *4 Public Welfare Institute of Scientific Research Foundation, *5 Department of Microbiology, St. Mariana University School of Medicine, *6 R & D Center, The Himalaya Drug Company)
Anticancer Research, **22**, 3293–3302 (2002)

Pretreatment of mice with lyophilized hot water extracts of five poly-herbal formula

protected them from lethal infection by *E. coli*. ESR spectroscopy shows that these extracts produced radicals under alkaline condition, and scavenged radicals such as superoxide anion, hydroxyl radical and nitric oxide (NO) radical. There was a positive relationship between their radical intensity and radical scavenging activity. Among the extracts, HD-02 efficiently inhibited the production of NO and citrulline, and the expression of inducible NO synthase (iNOS) mRNA by LPS-stimulated mouse macrophage-like cells Raw 264.7 DLH-3073 not only inhibited the LPS-stimulated NO production at lower concentrations, but also induced NO production at higher concentrations, suggesting the presence of two different antagonizing components in the DLH-3037 extract. These data suggest that poly-herbal extracts may alleviate radical-mediated diseases.

Free-flow electrophoresis in a microfabricated chamber with a micromodule fraction separator: Continuous separation of proteins

Hidesaburo Kobayashi, Katsuyoshi Shimamura, Tomohiko Akaida, Kenji Sakano, Nobuyoshi Tajima*, Jun Funazaki*, Hirobumi Suzuki* and Etsuo Shinohara* (* Olympus Optical Co. Ltd., Hachioji 192-8512, Japan)

Journal of Chromatography A, **990**, (169-178) 2003

Continuous free flow electrophoresis of proteins was carried out in a microfabricated free flow electrophoresis (mFFE) module. The newly developed micromodule fraction separator (MFS) was attached to the down-stream end site of the separation chamber of mFFE. By using the MFS, electrolyte solution from the separation chamber was introduced to the peristaltic pump without disturbing the electrolyte solution flow at the bottom side of the chamber. The separation of protein mixture samples was achieved by a hydroxypropylmethylcellulose (HPMC) pretreatment coating of the separation chamber. The pretreatment of the sample chamber effectively suppressed electroosmotic flow (EOF). All fractionated samples were collected using the MFS after continuous electrophoresis and analyzed by reversed-phase HPLC. From the results of HPLC analyses none of the cytochrome *c* fractions at the other ports revealed cross talk phenomena at adjacent ports. A similar result occurred for the myoglobin. This means that these proteins were completely separated from each other by continuous mFFE, and the MFS functioned efficiently during continuous electrophoresis.

Molecular Weight of a Purified Acid Phosphatase Allozyme (ACPH^h) from *D.virilis*

Sumiko Narise and Hiroko T. Kitagawa

Drosophila Information Service **84**, 24-27 (2001)

Acid phosphatases (ACPH, EC3.1.3.2) have been found in every organism studied to date. Biochemical studies have indicated that ACPH in *D.melanogaster* is a homodimer with a subunit molecular weight of 50,189, when deduced from the nucleotide sequence of

Acp1 gene. In *D. virilis*, four electromorphs specified by alleles (*Acp1*¹, *Acp1*², *Acp1*³ and *Acp1*⁴) at *Acp1* locus have been detected. Previous study showed that the ACPH allozymes are glycoproteins containing mainly neutral sugars and are anchored to lysosomes, and the ability of the allozymes to be incorporated into lysosomes is varied. This report deals with enzyme purification of ACPH⁴, and the determination of its exact molecular weight.

240g flies yielded 1.6mg ACPH⁴ protein of approximately 1000 fold purification with a recovery of about 6%. Estimation of the molecular weight of the purified ACPH⁴ was carried out by MALDI-TOF mass spectrometry. ACPH⁴ exhibited major protein peaks (Mr 43911.9) for a subunit (monomer) and (Mr 88214.5) for a dimer. This estimated molecular weight is about 6,000 Dalton smaller than that above described. In comparison with the structure of the lysosomal ACPH, the first 33 residues were estimated to be a N-terminal signal peptide, and the last 36 residues, a C-terminal, respectively. If it is true, the 44,000 molecular weight of ACPH⁴ seems to be reasonable, since the mature ACPH⁴ might have no signal peptides.

PHYSICAL EDUCATION

A Study of Line-up Analysis in International Women's Volleyball Matches: Comparison of Maximum Likelihood and Point Method Analysis

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Reprinted from Journal of Physical Exercise and Sports Science, 8, 7-17 (2002)

Past research has performed analysis only with the in-court serve using the maximum likelihood method (ML). This research has tried a maximum likelihood method and a point method (PM) in-court serve and all-court serve analysis for 16 matches among the 28 matches of 2000 Olympic Women's Qualification Finals matches.

This research has tried in-court serve/all-court serve comparison for matches played for the 1999 World Cup through the 2000 Olympics. Because, it showed that to a tendency for match wins even when the serve fault point rate of the winning team was higher than the opposing team and reduced total power indexes, an in-court serve analysis was given priority. Maximum likelihood and point method comparison showed a high correlation of $r = 0.918$ ($p < 0.001$) and $r = 0.925$ ($p < 0.001$) respectively for in-court serve and all-court serve total power index correlation.

Key word: volleyball game analysis, maximum likelihood, BT model, total power index

2. Books, Reviews and Other Printings

MATHEMATICS

The b -function and the holonomy diagram of a regular simple prehomogeneous vector space ($GL_1 \times Spin_{10}$, (*half-spin rep.*) + (*vector rep.*))

S. Kasai; *Journal of Algebra* 235 (2001), No.1, 1-14 by T. Kogiso in *Mathematical Reviews of American Math. Soc.* (2002)

The b -functions of a regular simple prehomogeneous vector space ($GL_1 \times SL_{2m}$, $A_2 + (A_1 + A_1)^{(\vee)}$)

S. Kasai; *Japan J. Math.* 26 (2002), No.2, 355-379 by T. Kogiso in *Mathematical Reviews of American Math. Soc.* (2002)

Relatively Simple Chain Complexes

山崎正之

数理解析研究所講究録 1290, 104-107 (2002)

CHEMISTRY

カルボン酸イオン架橋遷移金属三核錯体の単座配位子置換速度におよぼす置換基の電子的・立体的効果

藤原隆司^{*1}, 永澤 明^{*1,2} (*1 埼玉大学理学部, *2 非常勤講師)
埼玉大学分析センター機関誌, 22, 2-9 (2002)

磁気共鳴法を用いた特殊な場に存在する水の構造解析 (第3報)

山中弘次^{*1}, 矢野大作^{*1}, 永澤 明^{*1,2} (*1 埼玉大学理学部, *2 非常勤講師)
埼玉県地域共同研究センター紀要, 2, 33 (2002)

食品の製造工程管理への NMR の応用 (Ⅲ)。ゆで麵の観察における高分解能 MRI と Compact MRI の比較

小島登貴子^{*1}, 堀金明美^{*1}, 吉田 充^{*1}, 松田善正^{*1}, 拜師友之^{*1}, 巨瀬勝美^{*1}, 永澤 明^{*1,2} (*1 埼玉大学理学部, *2 非常勤講師)
埼玉県工業技術センター研究報告, 5 (2003)

化学

吉田俊久^{*1}, 永澤 明^{*1,2} (*1 埼玉大学理学部, *2 非常勤講師)

知恵蔵 2003, 2002

よい大学入試とは何なのか—21世紀の日本の化学のために(その8) 高校と大学の化学の差は、
人文科学としての理科と自然科学としての理科の差だ

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化学と教育, 50, 478-479, 2002

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化学と教育, 50, 867-868, 2002

BIOLOGY

キイロシヨウジヨウバエのメラニン性腫瘍形成系統における性モザイク

小須田和彦

城西大学研究年報(自然科学編), 26, 61-66 (2002)

EARTH SCIENCE

関東山地の四万十帯のホルンフェルスV—北都留郡小菅谷の泥質岩変成鉱物の産状と化学組成—

加賀美英雄, 谷口英嗣* (* 駒澤大学高等学校)

城西大学研究年報(自然科学編), 26, 1-45 (2002)

中国水石の地学

加賀美英雄

季刊水路 31, 2, 39-43 (2002)

PHYSICAL EDUCATION

レジャー活動における「するスポーツ」の楽しみ方に関する研究（第1報）—スポーツ用具・遊具の活用について—

横内靖典, 西田俊夫* (*淑徳大学)

城西大学研究年報 (自然科学編), 26, 67-82 (2002)

東京箱根間往復大学駅伝競走に出場する選手の記録に関する一考察

平塚 潤, 櫛部静二* (*日本体育大学大学院)

城西大学研究年報 (自然科学編), 26, 83-88 (2002)

ナショナルチームにおけるスポーツ医科学サポートの現状—バレーボール競技のメディカルサポート—

林 光俊*¹, 前田如矢*², 明石正和, 岡崎壮之*³, 川之上豊*⁴, 綱村昭彦*⁵, 藤本繁夫*⁶, 山本外憲*⁷, 森北育宏*⁸, 布村忠弘*⁹, 和田祐一*¹⁰, 松谷正秀*¹¹ (*1 杏林大学整形外科, *2 武庫川女子大学, *3 川崎製鉄千葉病院, *4 大妻女子大学, *5 光華女子大学, *6 大阪市立大学, *7 杏林大学, *8 大阪市更正療育センター, *9 富山大学, *10 千葉大学医学部, *11 あびこ病院)

平成12年度科学研究論集, 第1号, 2001年3月, pp.47-52

バレーボール男子ナショナルチームの栄養調査

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平成12年度科学研究論集, 第1号, 2001年, pp.53-56

トップレベルバレーボール選手の外傷・障害調査—アンケート調査により—

森北育宏*¹, 前田如矢*², 明石正和, 岡崎壮之*³, 川之上豊*⁴, 林 光俊*⁵, 田中信雄*⁶, 藤本繁夫*⁷, 山本外憲*⁸, 布村忠弘*⁹ (*1 大阪市更正療育センター, *2 武庫川女子大学, *3 川崎製鉄千葉病院, *4 大妻女子大学, *5 杏林大学整形外科, *6 京都産業大学, *7 大阪市立大学, *8 杏林大学, *9 富山大学)

平成12年度科学研究論集, 第1号, 2001年, pp.57-59

アフリカンランナーにおけるレース前後のPOMSの変化について

山本正彦*¹, 木村瑞生*¹, 古泉一久*², 前河洋一*³ (*1 東京工芸大学, *2 城西大学非常勤講師, *3 国際武道大学)

陸上競技紀要 Vol.15, 2002年

3. Oral Presentations

MATHEMATICS

Product of Involutions

石橋宏行

第6回「代数, 言語, 計算理論」シンポジウム, 神奈川工科大学, 2002年12月20日~21日

An approach to stability of controlled L-groups with non-trivial local fundamental groups

山崎正之

研究集会「新しい観点からみた変換群論」(京都大学数理解析研究所), 2002年5月

On stability of controlled surgery

山崎正之

変換群論シンポジウム (ICU), 2002年11月

CHEMISTRY

HCl の高分解能スペクトルの Optimal parameter fit と adiabatic effect の決定

上原博通, 堀合公威, 秋山和史

日本化学会第81春季年会 (東京), 2002年4月, 講演要旨集 I, p. 532

$^2\Sigma$ 電子状態分子に対する Born-Oppenheimer 近似 breakdown の解析

上原博通, 堀合公威

分子構造総合討論会 (神戸), 2002年10月, 講演要旨集, p. 55

$^{12}\text{C}^{16}\text{O}_2 - ^{12}\text{C}^{18}\text{O}_2$ の赤外ダイオードレーザー分光

尾崎 裕, 紺野東一, 小河 浩, 堀合公威, 上原博通

分子構造総合討論会 (神戸), 2002年10月, 講演要旨集, p. 331

水溶液中の疎水性炭化水素の粘度 B 係数

末岡一生

日本化学会第 81 春季年会 (東京), 2002 年 3 月, 講演要旨集 I, 2D5-27

Photocatalytic Decomposition of the Sodium Dodecylbenzene Sulfonate Surfactant in Aqueous Titania Suspensions Exposed to Highly concentrated Solar Radiation and Effects of Additives

Hisao Hidaka^{*1}, Jincal Zhao^{*2}, Satoshi Horikoshi^{*1}, and Toshiyuki Oyama (*1 Frontier Research Center for the global Environmental Protection, Meisei University, *2 Institute of Chemistry, Chinese Academy of Sciences)

2nd European Meeting on Solar-Chemistry and Photocatalysis: Environmental Applications Saint-Avold (France), May 29-31, 2002

TiO₂/TCO 電極を用いた水溶性有機化合物の光分解に伴う光電流獲得; 印加電圧と pH 依存性

小池崇喜^{*1}, 大山俊之, 堀越 智^{*1}, 日高久夫^{*1} (*1 明星大学地球環境保全センター)

日本化学会第 81 春季年会 (東京), 2002 年 3 月

太陽光集光照射装置を用いた TiO₂ 触媒による市販洗剤の光分解

青島明男^{*1}, 大山俊之, 堀越 智^{*1}, 日高久夫^{*1} (*1 明星大学地球環境保全センター)

日本化学会第 81 春季年会 (東京), 2002 年 3 月

集光照射装置を用いた太陽光による陰イオン界面活性剤 DBS の光触媒分解

大山俊之, 張 天永^{*1}, 堀越 智^{*1}, 趙 進才^{*2}, N. セルフォン^{*3}, 日高久夫^{*1} (*1 明星大学地球環境保全センター, *2 Institute of Chemistry, Chinese Academy of Sciences, *3 Department of Chemistry and Biochemistry, Concordia University)

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太陽光集光照射装置を用いた市販洗剤の光触媒分解

青島明男^{*1}, 大山俊之, 堀越 智^{*1}, 日高久夫^{*1} (*1 明星大学地球環境保全センター)

第 41 回日本油化学会年会 (東京), 2002 年 9 月

2.4 アズレンキノンの合成

若林英嗣, 内山 譲, 橋本雅司, 栗原照夫, 安並正文^{*1} (*1 日大工)

第 16 回基礎有機化学討論会 (東京大学駒場キャンパス), 2002 年 10 月, 2p044

3,6-ジアルキル置換ピペラジン-2,5-ジオン類の簡便ジチオン化と同ピペラジン-2,5-ジチオン類の酸化的 S-アルキル化

村岡 亘, 川久保伸明, 木賊理恵, 山本達夫
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研究室における高揮発性溶媒の完全回収と再利用法

山本達夫, 村岡 亘
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アミノインデンジチオカルボン酸類の合成。同ジチオカルボン酸の芳香族アルデヒドとの反応によるインデノ-3,1-チアジン-4-チオン類の生成

村岡 亘, 比嘉辰典, 高橋 満, 山本達夫
日本化学会第 81 春季年会 (東京), 2002 年 4 月, 講演要旨集

青い水溶液から結晶化した褐色の $[\text{Ni}(\text{trien})]_2$ の結晶構造 (trien = triethylenetetramine)

宮前 博, 工藤勝也, 日原五郎
日本化学会第 81 春季年会 (東京), 講演要旨集 I, p. 489

Temperature dependent bond distance variation in Ni complex with *N,N'*-bis(2-aminoethyl)-1, 3-propanediamine and *N,N'*-bis(3-aminopropyl)ethylenediamine

H. Miyamae, K. Aoki, and G. Hihara.
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温度で変わる結合距離を持つ Ni 錯体の結晶構造

宮前 博, 青木謙二, 日原五郎
日本結晶学会年会 (東京), 講演要旨集, p. 63.

Preparation and properties of oligomers of the carboxylate-bridged trinuclear chromium(III), molybdenum(IV), and cobalt(III) complexes

A. Nagasawa, T. Fujihara*, N. Hosoda*, S. Kumakura (*Department of Chemistry, Saitama University)
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分子内塩型ジチオカルボキシラートを配位子とするニッケル及びパラジウム錯体の合成と性質

菅谷知明^{*1}, 藤原隆司^{*1}, 永澤 明^{*1,2} (*1 埼玉大学理学部, *2 非常勤講師)

第 52 回錯体化学討論会, 2002 年 9 月 30 日～10 月 2 日, 東京, 1P-A33 (要旨集 p. 74)

ルテニウム(Ⅲ) 二核錯体の架橋ジカルボン酸部分を π 共役性炭素鎖で連結した二量体の合成と性質

角田善浩^{*1}, 藤原隆司^{*1}, 永澤 明^{*1,2} (*1 埼玉大学理学部, *2 非常勤講師)

第 52 回錯体化学討論会, 2002 年 9 月 30 日～10 月 2 日, 東京, 2P-A32 (要旨集 p. 205)

カルボキシラト架橋ルテニウム(Ⅲ) 三核およびモリブデン(Ⅳ) 三核錯体を単位とする混合金属多核錯体の合成と分子内の電子的相互作用

細田憲男^{*1}, 藤原隆司^{*1}, 永澤 明^{*1,2} (*1 埼玉大学理学部, *2 非常勤講師)

第 52 回錯体化学討論会, 2002 年 9 月 30 日～10 月 2 日, 東京, 2P-A54 (要旨集 p. 216)

分子内塩型ビス(ジエチルアミノ)カルベニウムジチオカルボキシラート配位子を持つルテニウム(Ⅱ) 錯体の酸化還元化学種の溶存状態と電子状態

上原夕佳^{*1}, 井田雅也^{*1}, 藤原隆司^{*1}, 永澤 明^{*1,2} (*1 埼玉大学理学部, *2 非常勤講師)

第 52 回錯体化学討論会, 2002 年 9 月 30 日～10 月 2 日, 東京, 1P-B113 (要旨集 p. 114)

2,2'-ビピリジンが配位したクロム(Ⅲ) 錯体の電子状態と分子構造に関する理論的研究

藤原隆司^{*1}, 熊倉成和^{*1,4}, 永澤 明^{*1,4}, 寺崎由紀子^{*2}, 海崎純男^{*3} (*1 埼玉大学理学部, *2 富山商船高専, *3 大阪大学理学部, *4 非常勤講師)

第 52 回錯体化学討論会, 2002 年 9 月 30 日～10 月 2 日, 東京, 1P-B122 (要旨集 p. 118)

オキソ-カルボキシラト架橋をもつクロム(Ⅲ) 三核錯体の電子状態とカルボキシラト上の置換基の効果

増田典雄^{*1}, 熊倉成和^{*1,2}, 藤原隆司^{*1}, 永澤 明^{*1,2} (*1 埼玉大学理学部, *2 非常勤講師)

第 52 回錯体化学討論会, 2002 年 9 月 30 日～10 月 2 日, 東京, 1P-B132 (要旨集 p. 123)

クロム(Ⅲ) 錯体の光励起状態における電子的性質—パルス電子常磁性共鳴による研究—

前田直之^{*1}, 藤原隆司^{*1}, 永澤 明^{*1,2} (*1 埼玉大学理学部, *2 非常勤講師)

日本化学会第 83 春季年会, 2003 年 3 月 18 日～21 日, 東京, 1PC-010 (講演予稿集 I p. 562)

窒素六座配位子とカルボン酸イオンで架橋されたクロム(Ⅲ) 二核錯体の合成, 構造と性質

齋藤美希^{*1}, 藤原隆司^{*1}, 酒井奈菜^{*1}, 永澤 明^{*1,2} (*1 埼玉大学理学部, *2 非常勤講師)
日本化学会第 83 春季年会, 2003 年 3 月 18 日~21 日, 東京, 1PC-017 (講演予稿集 I p. 564)

カルボン酸架橋ルテニウム二核錯体の不安定酸化状態

佐藤 涼^{*1}, 藤原隆司^{*1}, 永澤 明^{*1,2} (*1 埼玉大学理学部, *2 非常勤講師)
日本化学会第 83 春季年会, 2003 年 3 月 18 日~21 日, 東京, 1PC-037 (講演予稿集 I p. 569)

平面型ビス(トロポロン-1,2,5-トリオキシマト) 錯体を骨格とする二核および多核錯体の合成と性質

原 匠^{*1}, 上田浩司^{*1}, 山口拓也^{*1}, 藤原隆司^{*1}, 永澤 明^{*1,2} (*1 埼玉大学理学部, *2 非常勤講師)
日本化学会第 83 春季年会, 2003 年 3 月 18 日~21 日, 東京, 1PC-086 (講演予稿集 I p. 581)

分子内塩型ジチオカルボキシラートを配位子とする 11, 12 族金属錯体の合成と性質

菅谷知明^{*1}, 藤原隆司^{*1}, 永澤 明^{*1,2} (*1 埼玉大学理学部, *2 非常勤講師)
日本化学会第 83 春季年会, 2003 年 3 月 18 日~21 日, 東京, 1PC-090 (講演予稿集 I p. 582)

ハト羽毛ケラチン bards の cDNA クローニング

高橋理恵子, 新井邦男, 横手よし子, 赤羽 競
第 75 回日本生化学会大会 (京都) 2002 年 10 月, 講演要旨集 p. 734

マイクロフリーフロー電気泳動モジュールを用いた HPMC ダイナミックコーティングによるタンパク分離

小林英三郎, 島村克好, 田島信芳*, 船崎 純*, 鈴木浩文*, 篠原悦夫* (* オリンパス光学工業)
第 9 回クロマトグラフィーシンポジウム, (豊橋) 2002 年 6 月, 要旨集, pp. 43-44

マイクロフリーフロー電気泳動モジュールを用いたタンパク分離 II 電気泳動分離における HPMC コーティング効果

小林英三郎, 島村克好, 田島信芳*, 船崎 純*, 鈴木浩文*, 篠原悦夫* (* オリンパス光学工業)
Separation Sciences 2001 (東京) 2002 年 7 月, 要旨集, pp. 103-104

モノリス/C18 クロマトカラムを用いた高濃度タンパク中のニトロトリプトファンの分析

小林英三郎, 小代義貴, 山倉文幸* (* 順天堂大学)
第 13 回クロマトグラフィー科学会議 (東京) 2002 年 10 月, 要旨集, pp. 59-60

マイクロモジュールフラクションセパレーターを装備した mFFE によるタンパクの連続分離

小林英三郎, 赤井田朋彦, 坂野賢二, 田島信芳*, 船崎 純*, 篠原悦夫*(* オリンパス光学工業)
第 22 回キャピラリー電気泳動シンポジウム 2002 (東京) 2002 年 12 月, 要旨集, pp. 25-26

Free-Flow Electrophoresis by Microfabricated Chamber with Micromodule Fraction Separator: Continuous Separation of Proteins

Hidesaburo Kobayashi, K. Shimamura, T. Akaida, K. Sakano, N. Tajima*, J. Funazaki*, H. Suzuki*, E. Shinohara* (* OLYMPUS Co. Ltd.)

The 13th International Symposium on Capillary Electro-separation Techniques (Helsinki, Finland), September 2002, Abstracts p. 59

Continuous Free-Flow Electrophoresis Separation of Proteins by Microfabricated Chamber with Micromodule Fraction Separator

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クロショウジョウバエ・酸性ホスファターゼ (*AcpH*) 遺伝子の解析と発現

北川浩子

第 75 回日本生化学会 (京都), 2002 年 10 月, 講演要旨集, p. 996

EARTH SCIENCE**関東山地のホルンフェルスとその礫について**

加賀美英雄, 谷口英嗣* (*駒澤大学高等学校)

日本第四紀学会大会 (松本), 2002 年 8 月, 講演要旨集 **32**, pp. 130-131

PHYSICAL EDUCATION

レジャー活動における「するスポーツ」の楽しみ方に関する研究—スポーツ用具・遊具の活用頻度について—

西田俊夫*, 横内靖典 (*淑徳大学)

第 29 回大会 日本体育学会東京支部, 2002 年 3 月

富士登山は高所トレーニングになるか

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ランニング学会 14 回大会, 2002 年 3 月

Effect of Climbing Mt. Fuji Weekly on Aerobic Capacity in Non-Expert Runner

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