

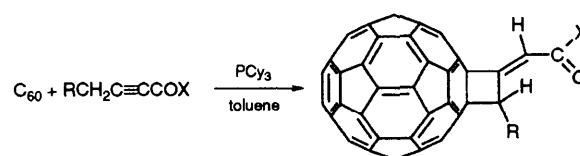
JOURNAL OF THE CHEMICAL SOCIETY

Chemical Communications

Number 24
1995

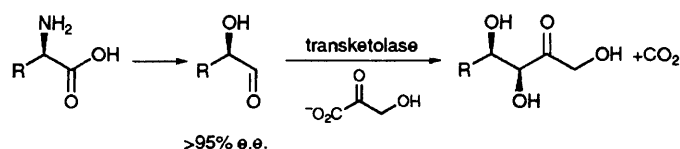
CONTENTS

- 2473 Phosphine-mediated [2 + 2] Cycloaddition of Internal Alk-2-ynoate and Alk-2-ynone to [60]Fullerene



Kou-Fu Liou, Chien-Hong Cheng

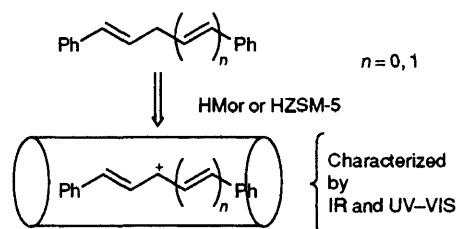
- 2475 Synthesis of Enantiomerically Pure α -Hydroxyaldehydes from the Corresponding α -Hydroxycarboxylic Acids: Novel Substrates for *Escherichia coli* Transketolase



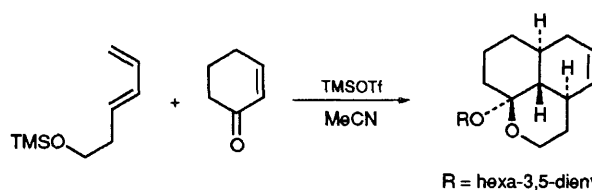
Enantiomerically pure (*R*)- α -hydroxyaldehydes have been prepared from the corresponding D-amino acids, and condensed with lithium hydroxypyruvate using *E. coli* transketolase.

Andrew J. Humphrey, Nicholas J. Turner,
Raymond McCague, Stephen J. C. Taylor

- 2477 Characterization of Persistent α,ω -Diphenyl Substituted Allyl Cations within Monodirectional Acid Zeolites

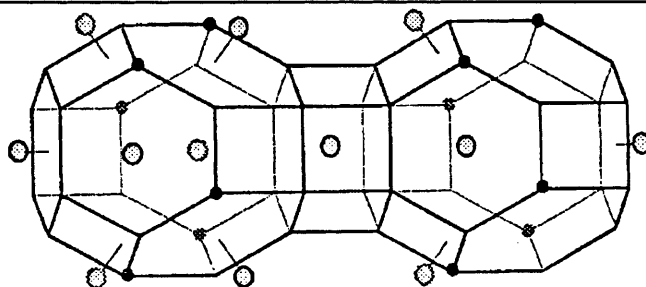
María L. Cano, Vicente Fornés, Hermenegildo
García, Miguel A. Miranda, Julia Pérez-Prieto

- 2479 Ionic 'Diels-Alder' Reactions of Hexa-3,5-dienyl Trimethylsilyl Ether and Enones: X-Ray Structural Determination of Adduct Stereostructure, and a Stereoselective Approach to *Trans*-fused Octalin Systems

Richard K. Haynes, Kwok-Ping Lam, Ian D.
Williams, Lam-Lung Yeung

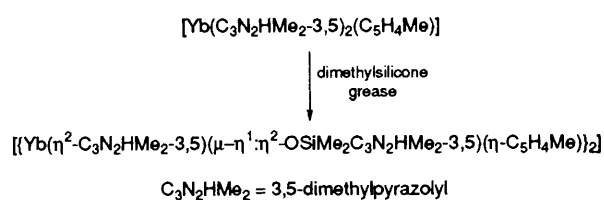
- 2481 **Investigation of the Influence of the Cations on Normal Modes of Y Zeolites: Vibrational Studies and Computer Simulations**

Knut Krause, Ekkehard Geidel, Joachim Kindler, Horst Förster, Heinz Böhlig



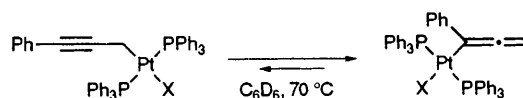
- 2483 **Novel Insertion of Dimethylsilanone into an Yb–N Bond and Molecular Structure of the Insertion Product** [$\{Yb(\eta^2-C_3N_2HMe_2-3,5)(\mu-\eta^1:\eta^2-OSiMe_2C_3N_2HMe_2-3,5)(\eta-C_5H_4Me)\}_2$]

Xigeng Zhou, Huaizhu Ma, Xiaoying Huang, Xiaozeng You



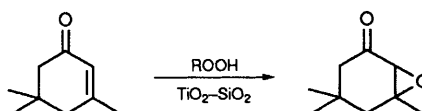
- 2485 **Mutual Isomerization of η^1 -Allenyl and η^1 -Propargyl Complexes of Platinum via a Five-coordinate η^3 -Allenyl/propargyl Intermediate**

Sensuke Ogoshi, Yoshiaki Fukunishi, Ken Tsutsumi, Hideo Kurosawa



- 2487 **Selective Epoxidation of α -Isophorone with Mesoporous Titania–Silica Aerogels and *tert*-Butyl Hydroperoxide**

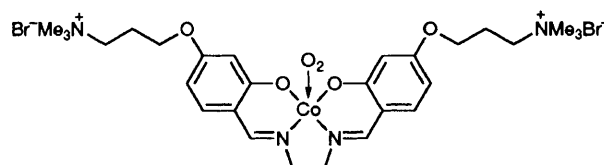
R. Hutter, T. Mallat, A. Baiker



Sol-gel derived titania–silica aerogels are excellent catalysts for the epoxidation of an electron-deficient α -keto olefin under mild conditions.

- 2489 **Ambient Oxygen Activating Water Soluble Cobalt–Salen Complex for DNA Cleavage**

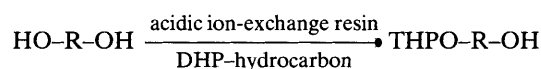
Santanu Bhattacharya, Subhrangsu S. Mandal



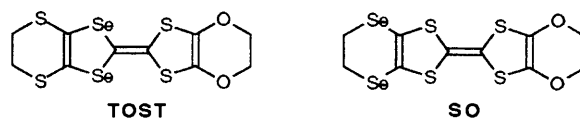
Above complex cleaves DNA under ambient aerobic conditions with modest G-selectivity

- 2491 **Highly Selective Monotetrahydropyranylation of Symmetrical Diols Catalysed by a Strongly Acidic Ion-exchange Resin**

Takeshi Nishiguchi, Masahumi Kuroda, Masahiko Saitoh, Akiko Nishida, Shizuo Fujisaki



- 2493 **Ethylenedithio(ethylenedioxo)-diselenadithiafulvalene (TOST) and Ethylenediseleno(ethylenedioxo)tetrathiafulvalene (SO): New Unsymmetrical π -Donors containing Three Elements in Group 16 (O, S, and Se)**



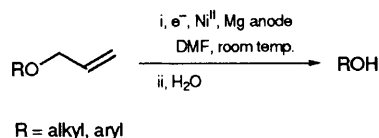
Tatsuro Imakubo, Yoshinori Okano, Hiroshi Sawa, Reizo Kato

- 2495 **Synthesis and Catalytic Properties of Mesoporous Tin Silicate Molecular Sieves**

The synthesis of mesoporous tin silicate molecular sieves possessing selective oxidation properties is reported.

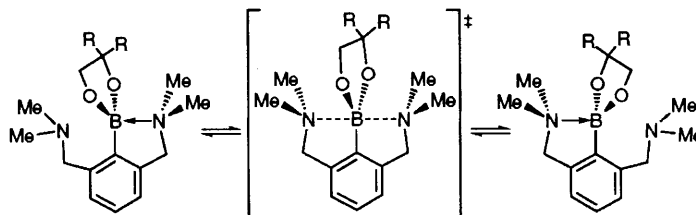
Tapan Kr. Das, Karuna Chaudhari, A. J. Chandwadkar, S. Sivasanker

- 2497 **Nickel-catalysed Electrochemical Reductive Deprotection of Allyl Ethers**



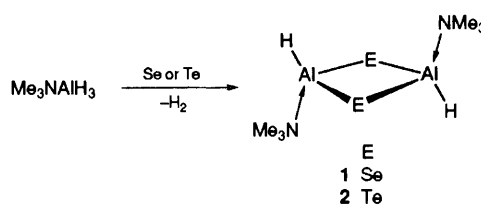
Sandra Olivero, Elisabet Duñach

- 2499 **Switching of Two Amine Ligands via an S_N2 -type Mechanism in a Coordinated Form of 2,6-Bis(*N,N*-dimethylaminomethyl)phenylboronates**



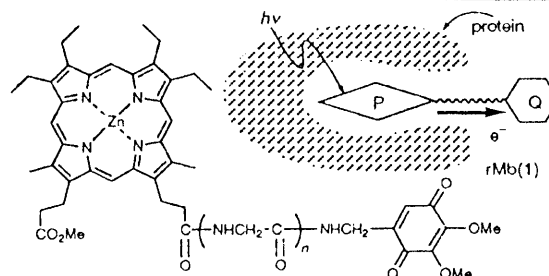
Shinji Toyota, Tadahiro Futawaka, Hiroshi Ikeda, Michinori Ōki

- 2501 **Alane Reduction of Selenium and Tellurium: Tertiary Amine Stabilised Dimeric Chalcogenides, $trans$ -[$\{Me_3N(H)Al(\mu-E)\}_2$] ($E = Se, Te$)**

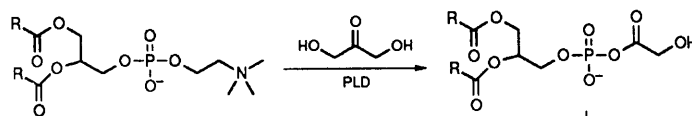


Michael G. Gardiner, Colin L. Raston, Vicki-Anne Tolhurst

- 2503 **Photoinduced Electron Transfer from Zinc Porphyrin to a Linked Quinone in Myoglobin**

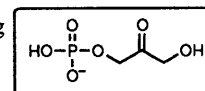
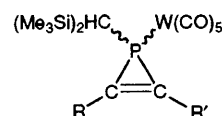


Takashi Hayashi, Tetsuo Takimura, Takafumi Ohara, Yutaka Hitomi, Hisanobu Ogoshi

2505 **Indirect Enzymatic Phosphorylation: Preparation of Dihydroxyacetone Phosphate**

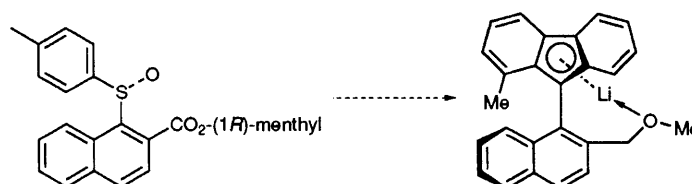
Paola D'Arrigo, Valentino Piergianni, Giuseppe Pedrocchi-Fantoni, Stefano Servi

The sequential use of phospholipase D and C starting from natural PC results in the net transfer of a phosphate unit from PC to dihydroxyacetone

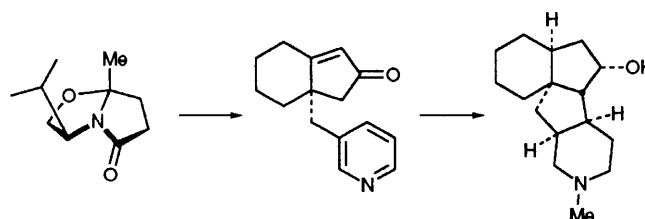
2507 **Easy Access to C,C' -Bifunctionalized 1*H*-Phosphirene–Tungsten Complexes: Evidence for Ambiphilic Reaction Behaviour of a Phosphanediyl–Tungsten Complex**

4a: R = H, R' = OEt
4b: R, R' = CO₂Me

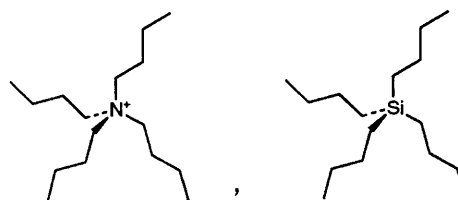
Annette Ostrowski, Jörg Jeske, Peter G. Jones, Rainer Streubel

2509 **Asymmetric 9-(1'-Naphthyl)fluorenes: Enantioselective Synthesis, Determination of Absolute Configuration and Retention of Axial Chirality in the Fluorenyl Carbanions**

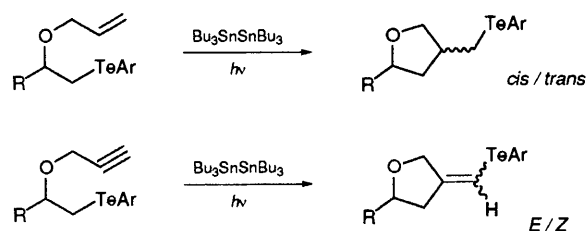
Robert W. Baker, Trevor W. Hambley, Peter Turner

2511 **Chiral Bicyclic Lactams—An Asymmetric Synthesis of the Framework of the *Lycopodium* Alkaloid Magellanine Containing all Six Adjacent Stereogenic Centres**

David A. Sandham, A. I. Meyers

2513 **Closed-shell Ion Pair Aggregation in Non-Polar Solvents characterized by NMR Diffusion Measurements**

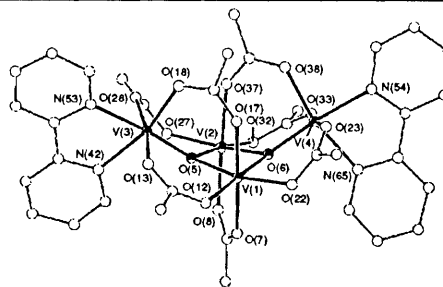
Susan Sondej Pochapsky, Huaping Mo, Thomas C. Pochapsky

2515 **Novel Group Transfer Cyclization Reactions of Organotellurium Compounds**

Lars Engman, Vijay Gupta

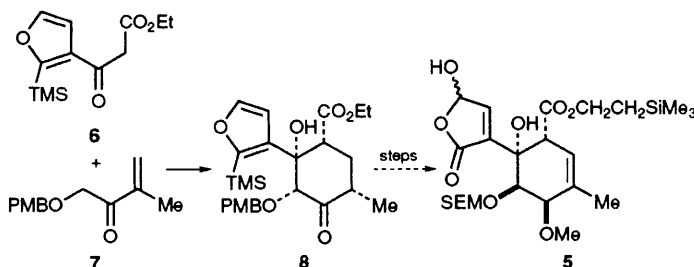
2517 **Tetranuclear Vanadium(III) Carboxylate Chemistry, and a New Example of a Metal Butterfly Complex exhibiting Spin Frustration: Structure and Properties of $[V_4O_2(O_2CEt)_7(bpy)_2](ClO_4)$**

Stephanie L. Castro, Ziming Sun, John C. Bollinger, David N. Hendrickson, George Christou



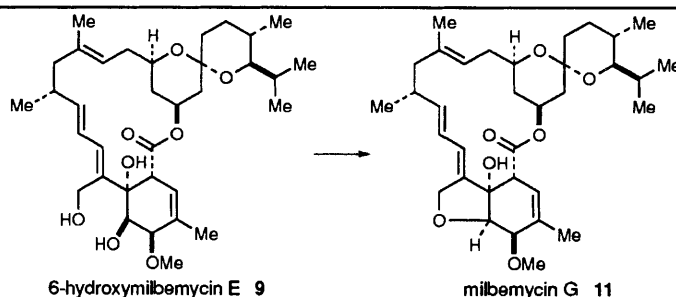
2519 **Total Synthesis of Milbemycin G: Synthesis of the C(1)–C(10) Fragment**

Simon Bailey, Aphiwat Teerawutgulrag, Eric J. Thomas



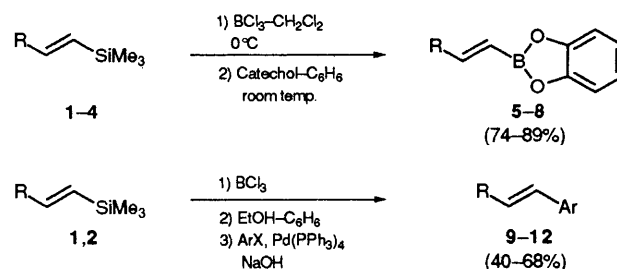
2521 **Total Synthesis of Milbemycin G: Assembly and Completion of the Synthesis**

Simon Bailey, Aphiwat Teerawutgulrag, Eric J. Thomas



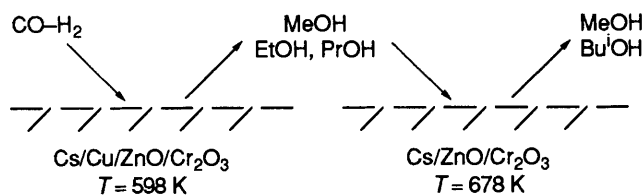
2523 **A Novel and Efficient Route to (*E*)-Alk-1-enyl Boronic Acid Derivatives from (*E*)-1-(Trimethylsilyl)alk-1-enes and a Formal Suzuki–Miyaura Cross-coupling Reaction starting with Vinylsilanes**

Gianluca M. Farinola, Vito Fiandanese, Luigia Mazzone, Francesco Naso



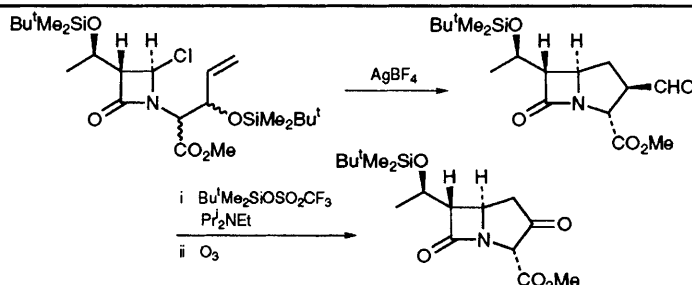
2525 **Synthesis of 2-Methylpropan-1-ol–Methanol Mixtures from H_2 –CO Synthesis Gas over Double-bed Cs/Cu/ZnO/Cr₂O₃ and Cs/ZnO/Cr₂O₃ Catalysts**

Alessandra Beretta, Qun Sun, Richard G. Herman, Kamil Klier



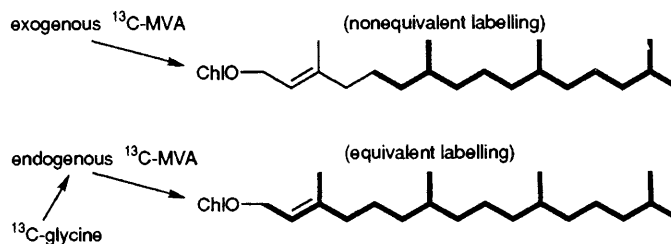
2527 **Novel Synthetic Approach to Carbapenems Utilizing Aza-Cope Mannich Cyclization**

Osamu Sakurai, Hiroshi Horikawa, Tameo Iwasaki



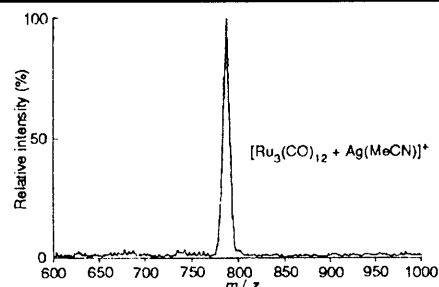
2529 **Biosynthesis of Chlorophyll a from ^{13}C -Labelled Mevalonates and Glycine in Liverwort. Nonequivalent Labelling of Phytol Side Chain**

Kensuke Nabeta, Teruki Kawae, Takahiro Kikuchi, Tatsuto Saitoh, Hiroshi Okuyama



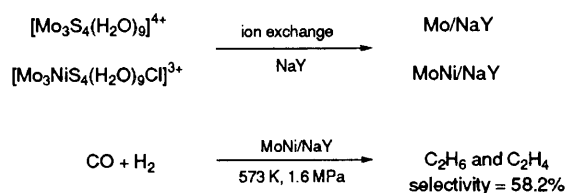
2531 **Electrospray Mass Spectrometry of Neutral Metal Carbonyl Complexes using Silver(I) Ions for Ionisation**

William Henderson, Brian K. Nicholson



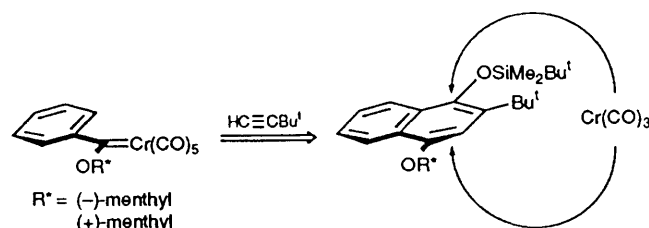
2533 **Preparation of Zeolites incorporating Molybdenum Sulfide Clusters with High C_2 Hydrocarbon Selectivity in $\text{CO}-\text{H}_2$ Reactions**

Mitsugu Taniguchi, Youichi Ishii, Takashi Murata, Takashi Tatsumi, Masanobu Hidai



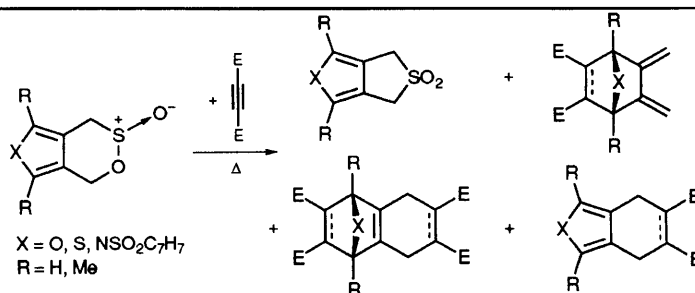
2535 **Optically Active Naphthalene- $\text{Cr}(\text{CO})_3$ Complexes via Diastereoselective Carbene Annulation and Haptotropic Metal Migration**

Karl Heinz Dötz, Christine Stinner, Martin Nieger



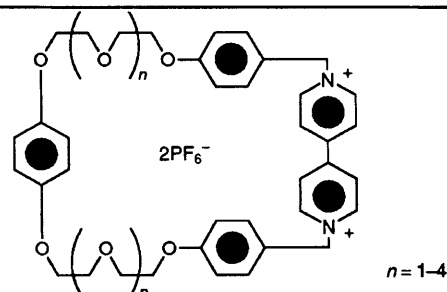
2537 **Synthesis of Furan-, Thiophene- and Pyrrole-fused Sultines and their Application in Diels-Alder Reactions**

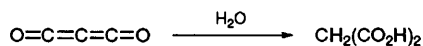
Wen-Sheng Chung, Wen-Ju Lin, Wen-Dar Liu, Liang-Gyi Chen



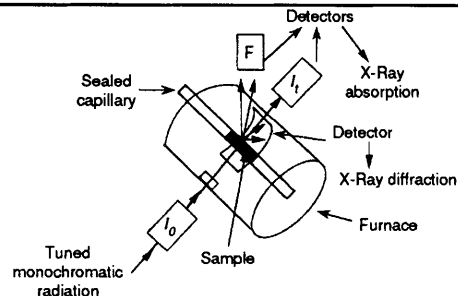
2541 **Cyclophanes with Self-recognising Components**

Pier-Lucio Anelli, Masumi Asakawa, Peter R. Ashton, George R. Brown, Wayne Hayes, Oldrich Kocian, Santiago Rodríguez Pastor, J. Fraser Stoddart, Malcolm S. Tolley, Andrew J. P. White, David J. Williams

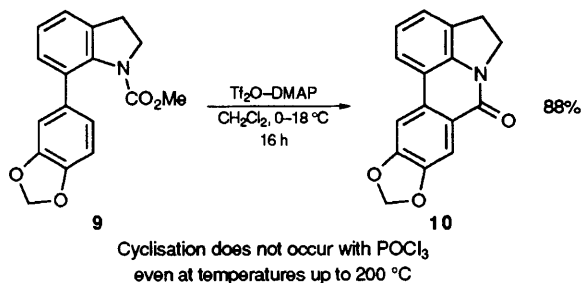


2547 **Kinetic and Theoretical Studies of the Hydration of Carbon Suboxide**

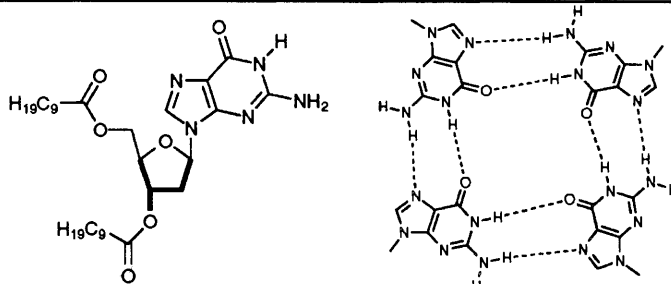
Annette D. Allen, Michael A. McAllister, Thomas T. Tidwell

2549 **Probing the Onset of Crystallization of a Microporous Catalyst by Combined X-ray Absorption Spectroscopy and X-ray Diffraction**

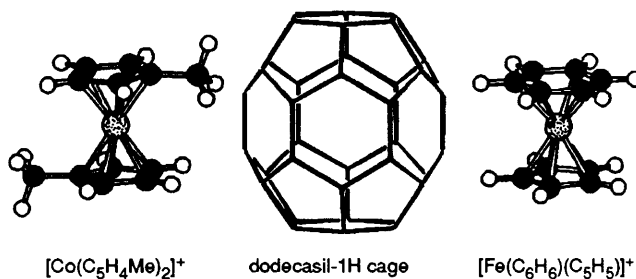
Gopinathan Sankar, John Meurig Thomas, Fernando Rey, G. Neville Greaves

2551 **Trifluoromethanesulfonic Anhydride-4-(*N,N*-Dimethylamino)pyridine as a Reagent Combination for Effecting Bischler–Napieralski Cyclisation under Mild Conditions: Application to Total Syntheses of the *Amaryllidaceae* Alkaloids *N*-Methylcrinasiadine, Anhydrolycorinone, Hippadine and Oxoassoanine**
Martin G. Banwell, Brett D. Bissett, Stefan Busato, Cameron J. Cowden, David C. R. Hockless, Jeffrey W. Holman, Roger W. Read, Angela W. Wu2555 **Self-Assembly in Organic Solvents of a Deoxyguanosine Derivative Induced by Alkali Metal Picrates**

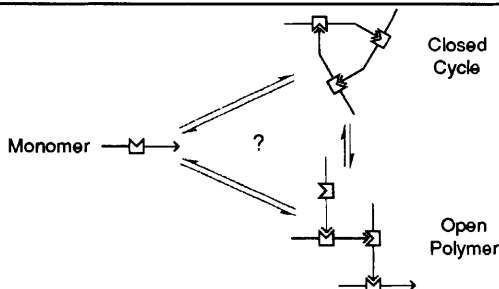
Giovanni Gottarelli, Stefano Masiero, Gian Piero Spada

2559 **Solvent-free Synthesis of Clathrasils using Metal–Organic Complexes as Structure-directing Agents**

Gianpietro van de Goor, Benedikt Lindlar, Jürgen Felsche, Peter Behrens

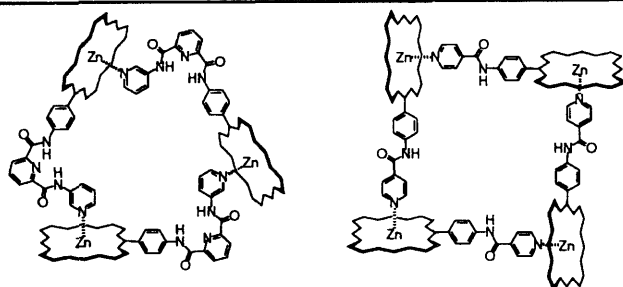
2563 **The Thermodynamics of Self-assembly**

Xianglan Chi, Andrea J. Guerin, Richard A. Haycock, Christopher A. Hunter, Luke D. Sarson

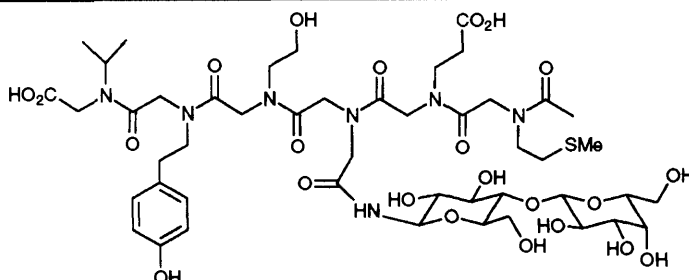


2567 Self-assembly of Macrocyclic Porphyrin Oligomers

Xianglan Chi, Andrea J. Guerin, Richard A. Haycock, Christopher A. Hunter, Luke D. Sarson

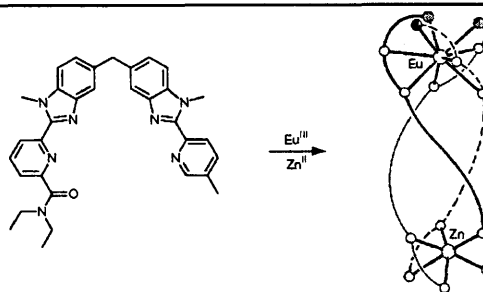
2571 Synthesis of New Glycopeptidomimetics Based on *N*-Substituted Oligoglycine bearing an *N*-Linked Lactoside Side-chain

Uttam K. Saha, René Roy



2575 The First Structurally Characterized and Strongly Luminescent Self-assembled Helical Heterodinuclear d-f Complex

Claude Piguet, Gérald Bernardinelli, Jean-Claude G. Bünzli, Stéphane Petoud, Gérard Hopfgartner

**Corrigenda**

2579 Immobilization of Small Proteins in Carbon Nanotubes: High-resolution Transmission Electron Microscopy Study and Catalytic Activity

S. C. Tsang, J. J. Davis, Malcolm L. H. Green, H. Allen O. Hill, Y. C. Leung, Peter J. Sadler

2580 Synthesis and Crystallographic Characterizations of Trinuclear (μ_3 -O) Zirconium Complexes

Florence Boutonnet, Maria Zablocka, Alain Igau, Joël Jaud, Jean-Pierre Majoral, Jutta Schamberger, Gerhard Erker, Stephan Werner, Carl Krüger

AUTHOR INDEX

- Allen, Annette D., 2547
 Anelli, Pier-Lucio, 2541
 Asakawa, Masumi, 2541
 Ashton, Peter R., 2541
 Baiker, A., 2487
 Bailey, Simon, 2519, 2521
 Baker, Robert W., 2509
 Banwell, Martin G., 2551
 Behrens, Peter, 2559
 Beretta, Alessandra, 2525
 Bernardinelli, Gérald, 2575
 Bhattacharya, Santanu, 2489
 Bissett, Brett D., 2551
 Böhlig, Heinz, 2481
 Bollinger, John C., 2517
 Boutonnet, Florence, 2580
 Brown, George R., 2541
 Bünzli, Jean-Claude G., 2575
 Busato, Stefan, 2551
 Cano, María, 2477
 Castro, Stephanie L., 2517
 Chandwadkar, A. J., 2495
 Chaudhari, Karuna, 2495
 Chen, Liang-Gyi, 2537
 Cheng, Chien-Hong, 2473
 Chi, Xianglan, 2563, 2567
 Christou, George, 2517
 Chung, Wen-Sheng, 2537
 Cowden, Cameron J., 2551
 D'Arrigo, Paola, 2505
 Das, Tapan Kr., 2495
 Davis, J. J., 2579
 Dötz, Karl Heinz, 2535
 Duñach, Elisabet, 2497
 Engman, Lars, 2515
 Erker, Gerhard, 2580
 Farinola, Gianluca M., 2523
 Felsche, Jürgen, 2559
 Fiandanese, Vito, 2523
 Fornés, Vicente, 2477
 Förster, Horst, 2481
 Fujisaki, Shizuo, 2491
 Fukunishi, Yoshiaki, 2485
 Futawaka, Tadahi, 2499
 García, Hermenegildo, 2477
 Gardiner, Michael G., 2501
 Geidel, Ekkehard, 2481
 Gottarelli, Giovanni, 2555
 Greaves, G. Neville, 2549
 Green, Malcolm L. H., 2579
 Guerin, Andrea J., 2563, 2567
 Gupta, Vijay, 2515
 Hambley, Trevor W., 2509
 Hayashi, Takashi, 2503
 Haycock, Richard A., 2563, 2567
 Hayes, Wayne, 2541
 Haynes, Richard K., 2479
 Henderson, William, 2531
 Hendrickson, David N., 2517
 Herman, Richard G., 2525
 Hidai, Masanobu, 2533
 Hill, H. Allen O., 2579
 Hitomi, Yutaka, 2503
 Hockless, David C. R., 2551
 Holman, Jeffrey W., 2551
 Hopfgartner, Gérard, 2575
 Horikawa, Hiroshi, 2527
 Huang, Xiaoying, 2483
 Humphrey, Andrew J., 2475
 Hunter, Christopher A., 2563, 2567
 Hutter, R., 2487
 Igau, Alain, 2580
 Ikeda, Hiroshi, 2499
 Imakubo, Tatsuro, 2493
 Ishii, Youichi, 2533
 Iwasaki, Tameo, 2527
 Jaud, Joël, 2580
 Jeske, Jörg, 2507
 Jones, Peter G., 2507
 Kato, Reizo, 2493
 Kawae, Teruki, 2529
 Kikuchi, Takahiro, 2529
 Kindler, Joachim, 2481
 Klier, Kamil, 2525
 Kocian, Oldrich, 2541
 Krause, Knut, 2481
 Krüger, Carl, 2580
 Kuroda, Masahumi, 2491
 Kurosawa, Hideo, 2485
 Lam, Kwok-Ping, 2479
 Leung, Y. C., 2579
 Lin, Wen-Ju, 2537
 Lindlar, Benedikt, 2559
 Liou, Kou-Fu, 2473
 Liu, Wen-Dar, 2537
 Ma, Huaizhu, 2483
 McAllister, Michael A., 2547
 McCague, Raymond, 2475
 Majoral, Jean-Pierre, 2580
 Mallat, T., 2487
 Mandal, Subhrangsu S., 2489
 Masiero, Stefano, 2555
 Mazzone, Luigia, 2523
 Meyers, A. I., 2511
 Miranda, Miguel A., 2477
 Mo, Huaping, 2513
 Murata, Takashi, 2533
 Nabeta, Kensuke, 2529
 Naso, Francesco, 2523
 Nicholson, Brian K., 2531
 Nieger, Martin, 2535
 Nishida, Akiko, 2491
 Nishiguchi, Takeshi, 2491
 Ogoshi, Hisanobu, 2503
 Ogoshi, Sensusuke, 2485
 Ohara, Takafumi, 2503
 Okano, Yoshinori, 2493
 Ōki, Michinori, 2499
 Okuyama, Hiroshi, 2529
 Olivero, Sandra, 2497
 Ostrowski, Annette, 2507
 Pastor, Santiago Rodríguez, 2541
 Pedrocchi-Fantoni, Giuseppe, 2505
 Pérez-Prieto, Julia, 2477
 Petoud, Stéphane, 2575
 Piergianni, Valentino, 2505
 Piguet, Claude, 2575
 Pochapsky, Susan Sondej, 2513
 Pochapsky, Thomas C., 2513
 Raston, Colin L., 2501
 Read, Roger W., 2551
 Rey, Fernando, 2549
 Roy, René, 2571
 Sadler, Peter J., 2579
 Saha, Uttam K., 2571
 Saitoh, Masahiko, 2491
 Saitoh, Tatsuto, 2529
 Sakurai, Osamu, 2527
 Sandham, David A., 2511
 Sankar, Gopinathan, 2549
 Sarson, Luke D., 2563, 2567
 Sawa, Hiroshi, 2493
 Schamberger, Jutta, 2580
 Servi, Stefano, 2505
 Sivasanker, S., 2495
 Spada, Gian Piero, 2555
 Stinner, Christine, 2535
 Stoddart, J. Fraser, 2541
 Streubel, Rainer, 2507
 Sun, Qun, 2525
 Sun, Ziming, 2517
 Takimura, Tetsuo, 2503
 Taniguchi, Mitsugu, 2533
 Tatsumi, Takashi, 2533
 Taylor, Stephen J. C., 2475
 Teerawutgulrag, Aphiwat, 2519, 2521
 Thomas, Eric J., 2519, 2521
 Thomas, John Meurig, 2549
 Tidwell, Thomas T., 2547
 Tolhurst, Vicki-Anne, 2501
 Tolley, Malcolm S., 2541
 Toyota, Shinji, 2499
 Tsang, S. C., 2579
 Tsutsumi, Ken, 2485
 Turner, Nicholas J., 2475
 Turner, Peter, 2509
 van de Goor, Gianpiero, 2559
 Werner, Stephan, 2580
 White, Andrew J. P., 2541
 Williams, David J., 2541
 Williams, Ian D., 2479
 Wu, Angela W., 2551
 Yeung, Lam-Lung, 2479
 You, Xiaozeng, 2483
 Zablocka, Maria, 2580
 Zhou, Xigeng, 2483

The Chemical Communications Editorial Board is pleased to announce the appointment of Associate Editors, with effect from 1 January 1996. From that date manuscripts should be directed to the appropriate Editor.

The Americas

Structural

Professor Jerry L. Atwood
123 Chemistry Building
University of Missouri
Columbia
Missouri 65211 USA
Tel (+1) (314) 882 8374
Fax (+1) (314) 882 2754
E-mail chemja@mizzou1.missouri.edu

Inorganic

Professor Malcolm H Chisholm
Department of Chemistry
Indiana University
Bloomington
Indiana 47405-4001 USA
Tel (+1) (812) 855 6606
Fax (+1) (812) 855 7148
E-mail chisholm@indiana.edu

Organic

Professor James D White
Department of Chemistry
153 Gilbert Hall
Oregon State University
Corvallis
Oregon 97331-4003 USA
Tel (+1) (541) 737 2173
Fax (+1) (541) 737 2660
E-mail whitej@ccmail.orst.edu

Europe

Organic and Organometallic

Professor Anthony G M Barrett
Department of Chemistry
Imperial College of Science,
Technology and Medicine
South Kensington
London, UK SW7 2AY
Tel (+44) (0) 171 594 5766
Fax (+44) (0) 171 594 5805
E-mail m.sahrle@ic.ac.uk

Inorganic

Professor Edwin C Constable
Institut für Anorganische Chemie
Universität Basel
Spitalstrasse 51
CH-4056 Basel, Switzerland
Tel & Fax (+41) 61 322 7311
E-mail constable@ubaclu.unibas.ch

Bioorganic and Medicinal

Professor Philip Kocienski
Department of Chemistry
University of Southampton
Southampton, UK SO17 1BJ
Tel (+44) (0) 1703 593332
Fax (+44) (0) 1703 593781
E-mail pjkl@soton.ac.uk

Physical

Professor Anthony C Legon
Department of Chemistry
University of Exeter
Stocker Road
Exeter
Devon, UK EX4 4QD
Tel (+44) (0) 1392 263488
Fax (+44) (0) 1392 263434
E-mail ACLegon@exeter.ac.uk

Materials

Professor Stephen Mann
School of Chemistry
University of Bath
Claverton Down
Bath, UK BA2 7AY
Tel (+44) (0) 1225 826122
Fax (+44) (0) 1225 826231
E-mail chssm@bath.ac.uk

All other regions and subjects

Dr Robert J Parker or Dr Adrian P Kybett
Chemical Communications,
Royal Society of Chemistry
Thomas Graham House
Science Park, Milton Road
Cambridge, UK CB4 4WF
Tel (+44) (0) 1223 420066
Fax (+44) (0) 1223 420247
E-mail chemcomm@rsc.org

Any author may submit a manuscript direct to Dr Parker or Dr Kybett at Cambridge if preferred.

Royal Society of Chemistry

Information Services

Authors' Diskette Submission Details

We welcome the submission of the text of your paper on a diskette in any of the formats listed below. If you wish to do this, please complete this form with the required information and return it with your diskette to the Editorial Office. Please ensure that the diskette is clearly labelled with your *name*, a short *title* of the paper and the *hardware* and *software* used.

Submission of the graphics files (ChemDraw preferred for structural formulae) on a separate disk is also encouraged.

The data on the diskette must correspond *exactly* to the *final* hardcopy version supplied.

Journal _____ Paper ref. no. _____

Author name _____

Paper title _____

Disk details

Hardware PC _____

Macintosh _____

Software (text) MS-Word _____ version _____

Word for Windows _____ version _____

WordPerfect _____ version _____

Wordstar _____ version _____

File names (text) _____

Typesetter

Disk used Yes/No/text only

Names and Symbols for the Transfermium Elements

Request for comments on IUPAC provisional recommendations

The text overleaf was published last year in *Pure and Applied Chemistry* as definitive IUPAC recommendations. However, as a consequence of subsequent criticism, especially from the USA, the IUPAC Bureau has reconsidered the situation, and has decided that the recommendations should revert to provisional status. Comments from the chemical community are therefore requested, and should be sent to:

Professor A. M. Sargeson
Research School of Chemistry
Australian National University
Canberra, ACT 0200
Australia

by 31st May 1996.

Introduction

The Transfermium Working Group (TWG) was set up in 1986 under the joint auspices of the International Union of Pure and Applied Chemistry (IUPAC) and the International Union of Pure and Applied Physics (IUPAP). Its conclusions, duly endorsed by IUPAC and IUPAP, were published in the following three reports:

1. Criteria that must be satisfied for the discovery of a new chemical element to be recognized, *Pure & Appl. Chem.*, **63**, 879–886 (1991).
2. Discovery of the transfermium elements: Introduction to the discovery profiles, *Pure & Appl. Chem.*, **65**, 1757–1763 (1993).
3. Discovery of the transfermium elements: Discovery profiles of the transfermium elements, *Pure & Appl. Chem.*, **65**, 1764–1814 (1993).

IUPAC went a stage further by inviting responses on reports 2 and 3 from the three major groups concerned, *i.e.*, Lawrence Berkeley Laboratory, California; Joint Institute for Nuclear Research, Dubna; and Gesellschaft für Schwerionenforschung, Darmstadt. These responses together with the TWG's reply to the responses were published unedited in *Pure & Appl. Chem.*, vol. 65, (1993), pp. 1815–1824.

Recommendations

The TWG recognized that the responsibility for naming the transfermium elements must rest with the IUPAC Commission on Nomenclature of Inorganic Chemistry (II.2). The Commission met in Balatonfüred (Hungary) on 31st August 1994 to consider the naming of the transfermium elements 101–109 inclusive. The Commission consisted of twenty chemists, all with equal voting rights, from twelve different countries, namely Australia, Finland, Hungary, Japan, Netherlands, Russia, South Africa, Spain, Sweden, Switzerland, United Kingdom and United States of America. The debate was wide-ranging, thoughtful and objective, bearing in mind the significance of the process to chemistry in general.

Beforehand, the three major groups involved in the discoveries had been asked for their proposals concerning the naming of the elements and the reasons for their choices. All three groups had responded. The Commission carefully considered the proposals, and at the beginning it addressed the precedents for naming elements. It agreed unanimously to continue the practice of naming elements after appropriate scientists, places and properties. However, it resolved (16 to 4 votes¹) that an element should not be named after a living person. The majority of the Commission felt that it was necessary to have the perspective of history in relation to these discoveries before such a decision was made. The Commission also agreed to accept the conclusions of the TWG as one of the bases for selecting names. In addition, it was sensitive to the suggestions from the three groups about the choices for the names. In the final analysis all the names chosen came from their proposals, but not necessarily in the order suggested.

Ultimately, the Commission reached the recommended names below with a remarkable degree of consensus as the voting figures display.

Element	Name	Symbol	Voting in favour
101	Mendelevium	Md	20
102	Nobelium	No	20
103	Lawrencium	Lr	20
104	Dubnium	Db	19
105	Joliotium	Jl	18
106	Rutherfordium	Rf	18
107	Bohrium	Bh	20
108	Hahnium	Hn	19
109	Meitnerium	Mt	20

The recommendations of the Commission as a whole were ratified unanimously by the Titular Members.

Regarding elements 101–103, the Commission accepted the 'status quo' even though it recognized the conclusion of the TWG that an error had been made in the initial report on the discovery of element 102 (Nobelium).

Element 104 was named Dubnium to recognize the distinguished contributions to chemistry and modern nuclear physics of the international scientific centre at Dubna near Moscow.

Joliotium was chosen as the name for element 105 to recognize the French scientist F. Joliot-Curie who contributed greatly to the development of nuclear physics and chemistry, and who shared the Nobel prize in 1935 with Mme. I. Curie.

Elements 106 and 107 were named after Ernest Rutherford (New Zealand) and Neils Bohr (Denmark), respectively, to recognize their distinguished contributions to our knowledge of atomic structure. The Commission recommends the name Bohrium (Bh) for element 107, instead of the proposed Nielsbohrium, so that it conforms to the names of the other elements named after individuals.

Naming the adjoining elements 108 and 109 after Otto Hahn (Germany) and Lise Meitner (Austria) recognizes their decisive role in the discovery of nuclear fission.

¹ All ballots were secret and scrutinized by two members from countries other than those of the institutions involved.

Journal of the Chemical Society Chemical Communications

1995, pp. 1—2580

© Copyright 1995 by the Royal Society of Chemistry

