

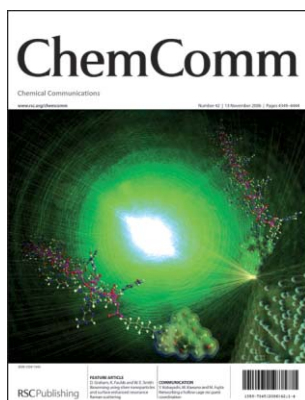
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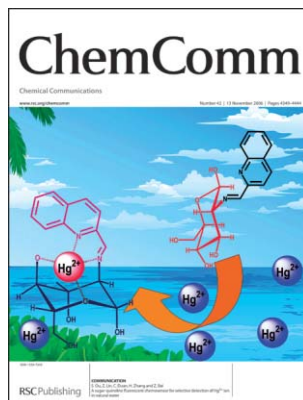
IN THIS ISSUE

ISSN 1359-7345 CODEN CHCOFS (42) 4349-4444 (2006)



Cover

See Duncan Graham *et al.*, page 4363.
The cover shows a laser beam (green) exciting a dye labelled DNA probe that only emits SERRS (yellow) when in contact with the silver nanoparticle. Image reproduced by permission of Duncan Graham, Karen Faulds and W. Ewen Smith from *Chem. Commun.*, 2006, 4363.



Inside cover

See C. Duan *et al.*, page 4392.
A fluorescent sensor incorporating a quinoline group and a D-glucosamine group was designed for detection of Hg^{2+} in natural water. Image reproduced by permission of S. Ou, Z. Lin, C. Duan, H. Zhang and Z. Bai from *Chem. Commun.*, 2006, 4392.

CHEMICAL TECHNOLOGY

T41

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November 2006/Volume 3/Issue 11

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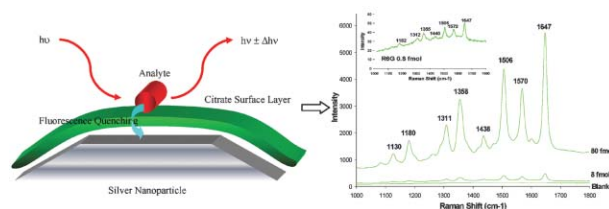
FEATURE ARTICLE

4363

Biosensing using silver nanoparticles and surface enhanced resonance Raman scattering

Duncan Graham,* Karen Faulds and W. Ewen Smith

Silver nanoparticles can be used to provide excellent surface enhanced resonance Raman scattering. Control of the surface chemistry and the use of appropriate protocols enables effective sensing of biomolecules.



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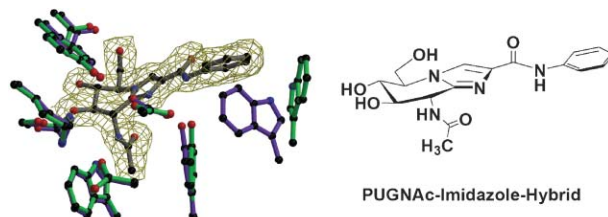
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4372

Inhibition of *O*-GlcNAcase by a *gluco*-configured nagstatin and a PUGNAc–imidazole hybrid inhibitor

Bhagavathy Shanmugasundaram,
Aleksandra W. Debowski, Rebecca J. Dennis,
Gideon J. Davies, David J. Vocadlo and Andrea Vasella*

A PUGNAc–imidazole hybrid provides a stable competitive inhibitor of human *O*-GlcNAcase as revealed through enzyme kinetics and structural analysis of an enzyme–inhibitor complex.

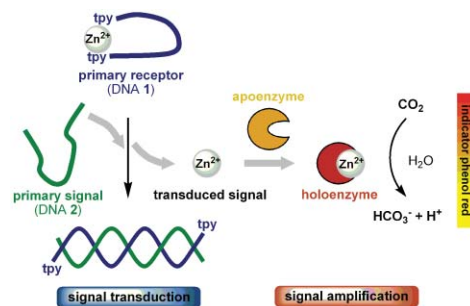


4375

Enzymatic amplification in a bioinspired, autonomous signal cascade

Nora Graf and Roland Krämer*

A two-step reaction cascade is applied to the sequence-specific detection of DNA. The molecular signal (DNA 2) is enzymatically amplified 10 000-fold and converted into an optical signal (color change) within seconds.

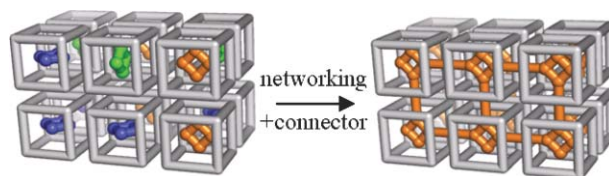


4377

Networking a hollow cage *via* guest coordination

Yasuhiro Kobayashi, Masaki Kawano* and Makoto Fujita*

A hollow coordination cage was successfully self-assembled to form a 2D-network *via* guest networking with a metal connector. Thanks to the networking, the hollow cage had a less symmetric cavity, preventing the guest site disorder problem which often hampers accurate X-ray analysis and anisotropic ordering of the guests.

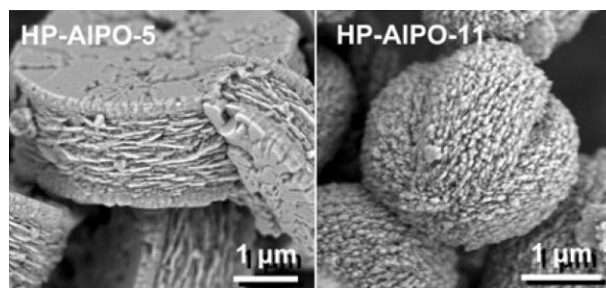


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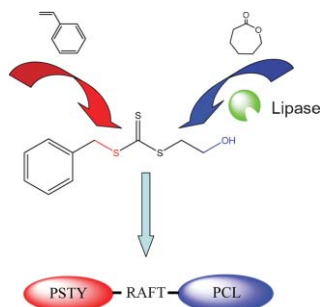
Organosilane surfactant-directed synthesis of mesoporous aluminophosphates constructed with crystalline microporous frameworks

Minkee Choi, Rajendra Srivastava and Ryong Ryoo*

Mesoporous aluminophosphates that are constructed with crystalline microporous $\text{AlPO}_4\text{-}n$ frameworks were directly synthesized by using organosilane surfactants as a mesopore director.



4383

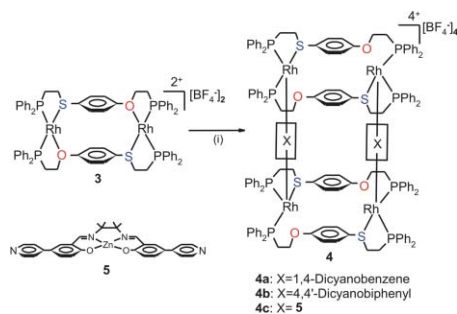


Simultaneous enzymatic ring opening polymerisation and RAFT-mediated polymerisation in supercritical CO₂

Kristofer J. Thurecht, Andrew M. Gregory, Silvia Villarroja, Jiaxiang Zhou, Andreas Heise and Steven M. Howdle*

The first simultaneous, metal-free synthesis of block copolymers through combination of enzymatic ring-opening polymerisation of ϵ -caprolactone with RAFT-mediated controlled radical polymerisation of styrene.

4386

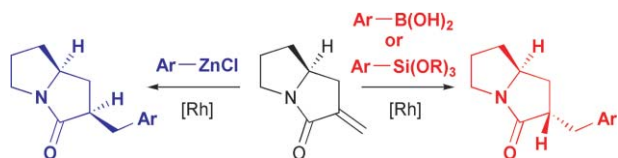


Tetrametallic rectangular box complexes assembled from heteroligated macrocycles

Aaron M. Brown, Maxim V. Ovchinnikov, Charlotte L. Stern and Chad A. Mirkin*

The reaction of a heteroligated Rh(I) bimetallic macrocycle with rigid ditopic ligands (1,4-dicyanobenzene, 4,4'-dicyanobiphenyl, or dipyridyl terminated salen ligand **5**) results in the formation of tetrametallic rectangular box complexes.

4389

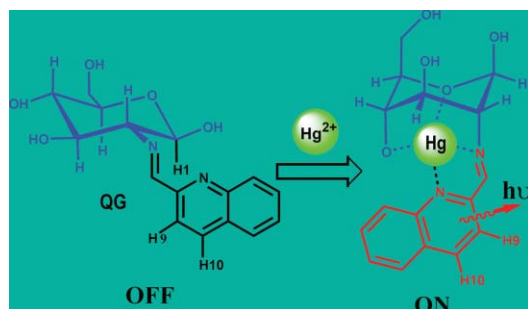


Switching stereoselectivity in rhodium-catalysed 1,4-additions: the asymmetric synthesis of 2-substituted pyrrolizidinones

Jonathan D. Hargrave, Gerwyn Bish and Christopher G. Frost*

The appropriate choice of organometallic nucleophile enables the straightforward preparation of different stereoisomers of 2-substituted pyrrolizidinones utilising the rhodium-catalysed 1,4-addition reaction.

4392



A sugar-quinoline fluorescent chemosensor for selective detection of Hg²⁺ ion in natural water

Shengju Ou, Zhihua Lin, Chunying Duan,* Haitao Zhang and Zhiping Bai*

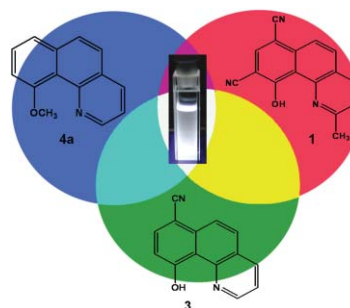
A selective and sensitive fluorescent sensor for detection of Hg²⁺ in natural water was achieved by incorporating the well-known fluorophore quinoline group and a water-soluble D-glucosamine group within one molecule.

4395

Extensive spectral tuning of the proton transfer emission from 550 to 675 nm via a rational derivatization of 10-hydroxybenzo[*h*]quinoline

Kew-Yu Chen, Cheng-Chih Hsieh, Yi-Ming Cheng, Chin-Hung Lai and Pi-Tai Chou*

Via mixing compounds **1**, **3** and **4a**, a qualitative white light generation can be achieved in ethyl acetate with a regular UV lamp (366 nm)

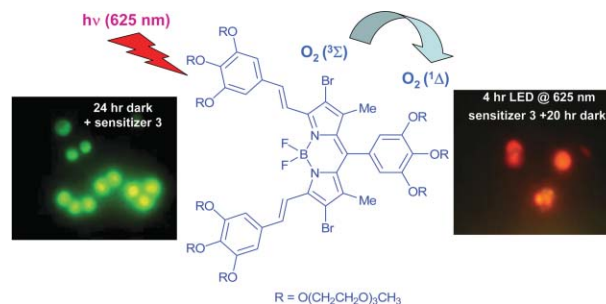


4398

Water soluble distyryl-boradiazaindacenes as efficient photosensitizers for photodynamic therapy

Serdar Atilgan, Zeynep Ekmekci, A. Lale Dogan, Dicle Guc and Engin U. Akkaya*

We introduce a novel class of water soluble, extended conjugation boradiazaindacene dyes which are efficient singlet oxygen generators and have spectacular photoinduced cytotoxicity when excited in the “therapeutic window” of the electromagnetic spectrum.

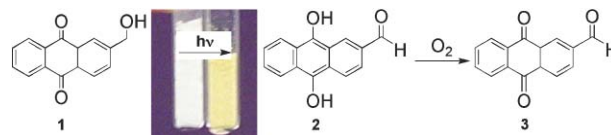


4401

A simple and smart oxygen sensor based on the intrazeolite reactions of a substituted anthraquinone

Katherine L. McGilvray, Michelle N. Chrétien, Matthew Lukeman and J. C. Scaiano*

Zeolite-incorporated 2-(hydroxymethyl)anthraquinone leads to a light-activated, reusable oxygen sensor that reports oxygen contamination events by simple visual inspection.

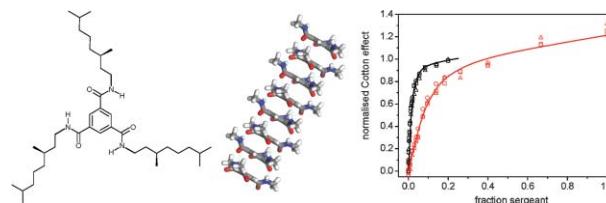


4404

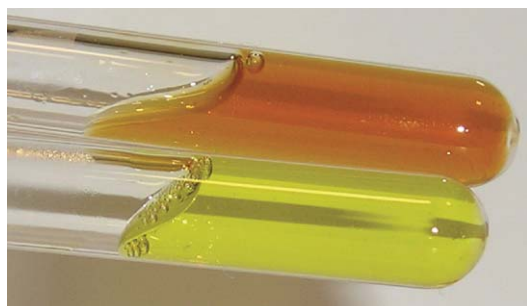
Amplification of chirality in benzene tricarboxamide helical supramolecular polymers

Andrew J. Wilson, Jeroen van Gestel, Rint P. Sijbesma* and E. W. Meijer*

Self-assembled benzene tricarboxamides obey ‘sergeants and soldiers’ and ‘majority rules’ principles. A recently developed theoretical model allows estimation of the energetic parameters that govern these effects, and gives considerable insight in the process.



4407



Photosensitive gelatin

Ana Vesperinas, Julian Eastoe,* Paul Wyatt, Isabelle Grillo and Richard K. Heenan

UV-induced changes in aggregation cause photo-rheological effects with aqueous complexes comprising a photodestructible surfactant and gelatin.

4410

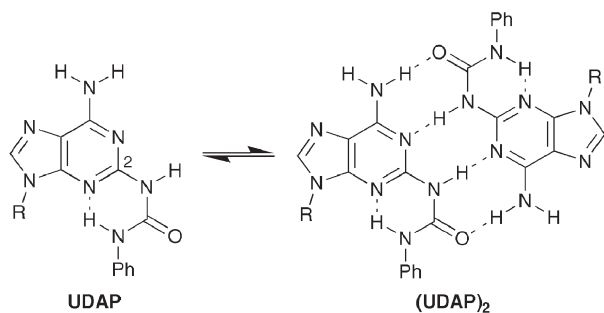


Monitoring the coordination of aluminium during microporous oxide crystallisation by *in situ* soft X-ray absorption spectroscopy

Andrew M. Beale, Ad M. J. van der Eerden, Didier Grandjean, Andrei V. Petukhov, Andy D. Smith and Bert M. Weckhuysen*

A new set-up for studying the aluminium coordination changes during microporous oxide crystallization using *in situ* soft X-ray absorption spectroscopy is described.

4413

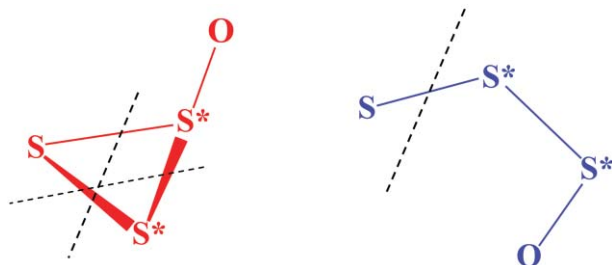


Self-complementary purines by quadruple hydrogen bonding

Alisha M. Martin, Roslyn S. Butler, Ion Ghiviriga, Rachel E. Giessert, Khalil A. Abboud and Ronald K. Castellano*

The first discrete, self-complementary, quadruply hydrogen-bonded complexes based on the 2,6-diaminopurine (DAP) scaffold have been prepared; regioselective urea formation at the C(2) amino group of the heterocycle allows intermolecular dimerization through a DADA hydrogen bonding motif.

4416



S₃O and S₃O⁺ in the gas phase: ring and open-chain structures

Giulia de Petris,* Marzio Rosi and Anna Troiani

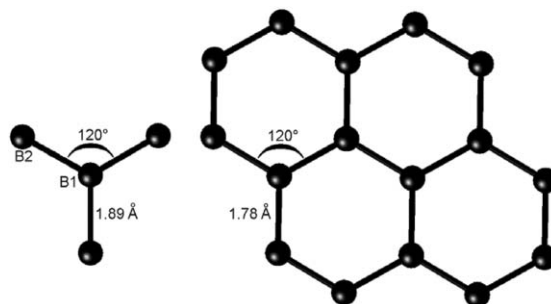
The structure of the sulfur-rich oxides S₃O and S₃O⁺, detected in the gas phase by mass spectrometric techniques, is assigned by high-resolution labelling experiments. Distinct fragmentation products prove that ring and open-chain isomers are formed in neutralization–reionization (NR) experiments of the S³⁴S₂O⁺ ion generated by S-transfer to ³⁴S₂O⁺.

4419

Synthesis of a missing structural link: the first trigonal planar B₄ units in the novel complex boride Ti_{1+x}Os_{2-x}RuB₂ (*x* = 0.6)

Boniface P. T. Fokwa, Jörg von Appen and Richard Dronskowski*

The complex solid-state boride Ti_{1+x}Os_{2-x}RuB₂ (*x* = 0.6) has been synthesized; its novel structure contains a trigonal planar, strongly bonded B₄ unit with a 1.89 Å long B–B distance.

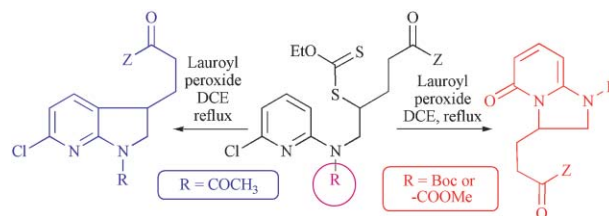


4422

An unprecedented radical ring closure on a pyridine nitrogen

Myriem El Qacemi,* Louis Ricard and Samir Z. Zard*

An unprecedented radical ring-closure onto the pyridine nitrogen was observed when certain types of substituents were present around the pyridine nucleus.

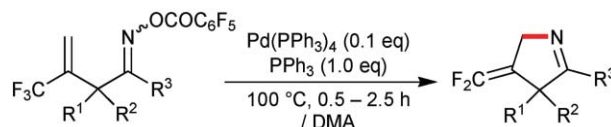


4425

5-endo Heck-type cyclization of 2-(trifluoromethyl)allyl ketone oximes: synthesis of 4-difluoromethylene-substituted 1-pyrrolines

Junji Ichikawa,* Ryo Nadano and Naotaka Ito

2-(Trifluoromethyl)allyl ketone *O*-pentafluorobenzoyloximes undergo a palladium-catalyzed 5-endo mode of alkene insertion *via* oxidative addition of the N–O bond, followed by β-fluorine elimination to produce 4-difluoromethylene-1-pyrrolines.

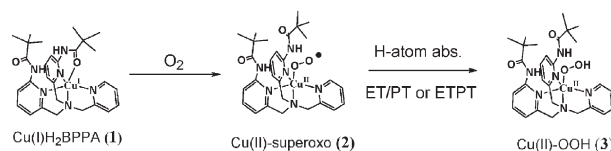


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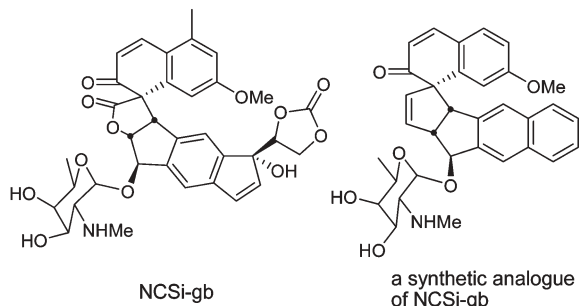
Mononuclear copper(II)–hydroperoxo complex derived from reaction of copper(I) complex with dioxygen as a model of DβM and PHM

Tatsuya Fujii, Syuhei Yamaguchi, Yasuhiro Funahashi, Tomohiro Ozawa, Takehiko Tosha, Teizo Kitagawa and Hideki Masuda*

A mononuclear copper(II)–hydroperoxo species has been generated by the reaction of the Cu(I)–H₂BPPA complex with dioxygen, which is a good model to understand the enzymatic reaction process of the Cu_B site in DβM and PHM.



4431



Spirocyclic helical compounds as binding agents for bulged RNA, including HIV-2 TAR

Ziwei Xiao, Na Zhang, Yiqing Lin, Graham B. Jones and Irving H. Goldberg*

Based on fluorescence binding studies and 1D ^1H NMR studies, designed synthetic analogues of NCSi-gb bind specifically with two-base bulged RNA, including HIV-2 TAR RNA, making them potential lead compounds for antiviral drug development.

4434

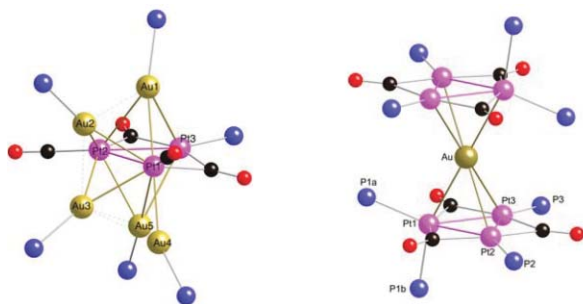


BF₃·OEt₂ and TMSOTf: A synergistic combination of Lewis acids

Eddie L. Myers, Craig P. Butts and Varinder K. Aggarwal*

The combination of BF₃·OEt₂ and TMSOTf gives BF₂OTf·OEt₂, which is a more powerful Lewis acid than its components and especially effective in CH₃CN solvent. The complex formed has been characterised by ^1H , ^{19}F , ^{11}B and ^{31}P (using Et₃PO as an additive) NMR spectroscopy.

4437

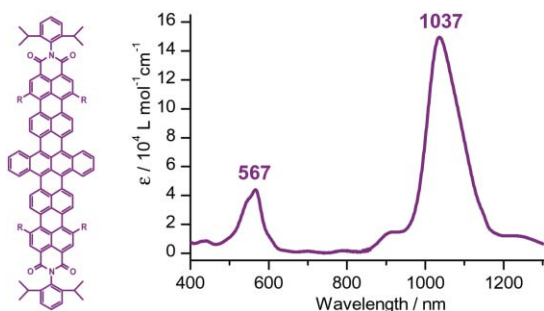


Structural/bonding insights from new geometrical varieties of two Pt–Au carbonyl/phosphine clusters, [Pt₃(AuPPh₃)₅(μ₂-CO)₂L₃]⁺ (L₃ = (CO)₂PPh₃) and [(μ₆-Au){Pt₃(μ₂-CO)₃L₄}₂]⁺ (L = PMe₃)

Namal de Silva, Jeffrey W. Laufenberg and Lawrence F. Dahl*

Pt₃Au₅ cluster featuring 44-eln. Pt₃ triangle with five AuPPh₃ ligands and 'full' (μ₆-Au)(Pt₃)₂ sandwich with two 44-eln. Pt₃(μ₂-CO)₃L₄ (L = PMe₃) asymmetrically encapsulating electrophilic Au(I).

4440



Dibenzopentarylenebis(dicarboximide)s: Novel near-infrared absorbing dyes

Yuri Avlasevich and Klaus Müllen*

The facile synthesis of the new class of core-extended rylene chromophores, dibenzopentarylenebis(dicarboximide)s, having an intense absorption at 1020–1040 nm, is presented.

AUTHOR INDEX

- Abboud, Khalil A., 4413
Aggarwal, Varinder K., 4434
Akkaya, Engin U., 4398
Atilgan, Serdar, 4398
Avlasevich, Yuri, 4440
Bai, Zhiping, 4392
Beale, Andrew M., 4410
Bish, Gerwyn, 4389
Brown, Aaron M., 4386
Butler, Roslyn S., 4413
Butts, Craig P., 4434
Castellano, Ronald K., 4413
Chen, Kew-Yu, 4395
Cheng, Yi-Ming, 4395
Choi, Minkee, 4380
Chou, Pi-Tai, 4395
Chrétien, Michelle N., 4401
Dahl, Lawrence F., 4437
Davies, Gideon J., 4372
Debowski, Aleksandra W., 4372
Dennis, Rebecca J., 4372
de Petris, Giulia, 4416
de Silva, Namal, 4437
Dogan, A. Lale, 4398
Dronskowski, Richard, 4419
Duan, Chunying, 4392
Eastoe, Julian, 4407
Ekmekci, Zeynep, 4398
Faulds, Karen, 4363
Fokwa, Boniface P. T., 4419
Frost, Christopher G., 4389
Fujii, Tatsuya, 4428
Fujita, Makoto, 4377
Funahashi, Yasuhiro, 4428
Ghiviriga, Ion, 4413
Giessert, Rachel E., 4413
Goldberg, Irving H., 4431
Graf, Nora, 4375
Graham, Duncan, 4363
Grandjean, Didier, 4410
Gregory, Andrew M., 4383
Grillo, Isabelle, 4407
Guc, Dicle, 4398
Hargrave, Jonathan D., 4389
Heenan, Richard K., 4407
Heise, Andreas, 4383
Howdle, Steven M., 4383
Hsieh, Cheng-Chih, 4395
Ichikawa, Junji, 4425
Ito, Naotaka, 4425
Jones, Graham B., 4431
Kawano, Masaki, 4377
Kitagawa, Teizo, 4428
Kobayashi, Yasuhiro, 4377
Krämer, Roland, 4375
Lai, Chin-Hung, 4395
Laufenberg, Jeffrey W., 4437
Lin, Yiqing, 4431
Lin, Zhihua, 4392
Lukeman, Matthew, 4401
Martin, Alisha M., 4413
Masuda, Hideki, 4428
McGilvray, Katherine L., 4401
Meijer, E. W., 4404
Mirkin, Chad A., 4386
Müllen, Klaus, 4440
Myers, Eddie L., 4434
Nadano, Ryo, 4425
Ou, Shengju, 4392
Ovchinnikov, Maxim V., 4386
Ozawa, Tomohiro, 4428
Petukhov, Andrei V., 4410
Qacemi, Myriem El, 4422
Ricard, Louis, 4422
Rosi, Marzio, 4416
Ryoo, Ryong, 4380
Scaiano, J. C., 4401
Shanmugasundaram, Bhagavathy, 4372
Sijbesma, Rint P., 4404
Smith, Andy D., 4410
Smith, W. Ewen, 4363
Srivastava, Rajendra, 4380
Stern, Charlotte L., 4386
Thurecht, Kristofer J., 4383
Tosha, Takehiko, 4428
Troiani, Anna, 4416
van der Eerden, Ad M. J., 4410
van Gestel, Jeroen, 4404
Vasella, Andrea, 4372
Vesperinas, Ana, 4407
Villarroya, Silvia, 4383
Vocadlo, David J., 4372
von Appen, Jörg, 4419
Weckhuysen, Bert M., 4410
Wilson, Andrew J., 4404
Wyatt, Paul, 4407
Xiao, Ziwei, 4431
Yamaguchi, Syuhei, 4428
Zard, Samir Z., 4422
Zhang, Haitao, 4392
Zhang, Na, 4431
Zhou, Jiayang, 4383

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