

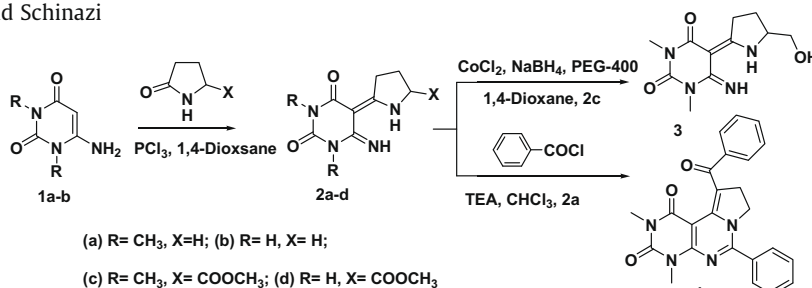
Tetrahedron Letters Vol. 51, No. 2, 2010

Contents

COMMUNICATIONS

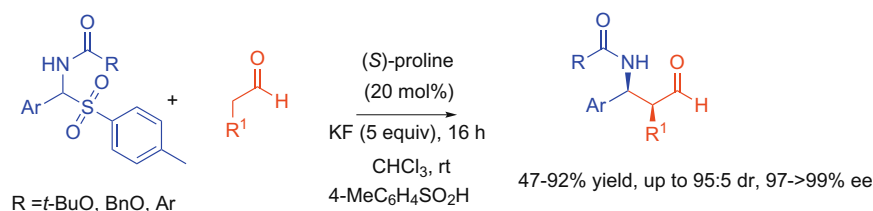
Synthesis of 6-imino-5-tetrahydro-1*H*-2-pyrrolylidenehexahydro-2,4-pyrimidinediones as intermediates for the synthesis of C-azanucleosides pp 231–233

Ashot Martirosyan^{*}, Rafael Tamazyán, Sahak Gasparyan, Marina Alexanyan, Henry Panosyan, Vahan Martirosyan, Raymond Schinazi



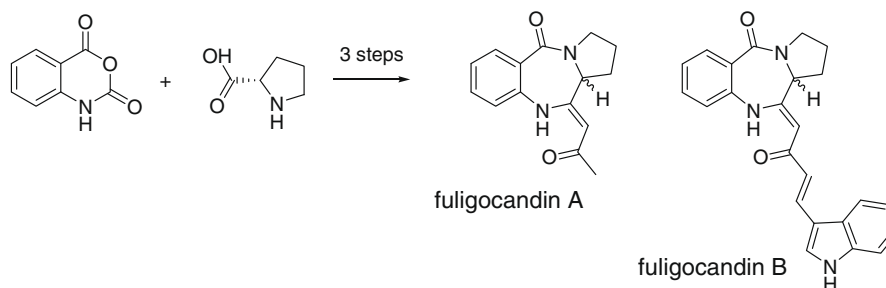
One-pot highly enantioselective catalytic Mannich-type reactions between aldehydes and stable α -amido sulfones: asymmetric synthesis of β -amino aldehydes and β -amino acids pp 234–237

Luca Deiana, Gui-Ling Zhao^{*}, Pawel Dzedzic, Ramon Rios, Jan Vesely, Jesper Ekström, Armando Córdoba^{*}



Total synthesis of fuligocandines A and B pp 238–239

Birgitta Pettersson, Vedran Hasimbegovic, Jan Bergman^{*}

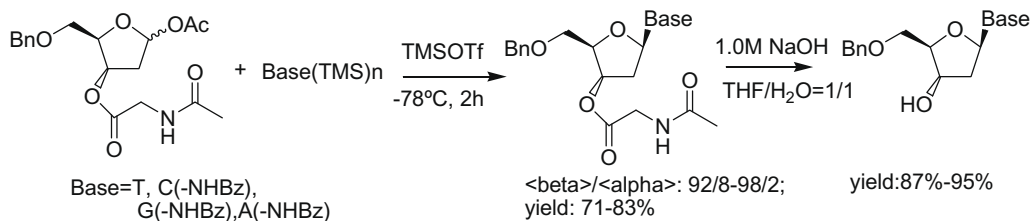


A practical synthesis of fuligocandines A and B from isatoic anhydride and proline using an Eschenmoser episulfide contraction as the key step is described.

Highly stereoselective synthesis of 2'-deoxy- β -ribonucleosides via a 3'-(*N*-acetyl)-glycyl-directing group

pp 240–243

Zhaogui Liu, Deyao Li, Biaolin Yin, Jiancun Zhang*

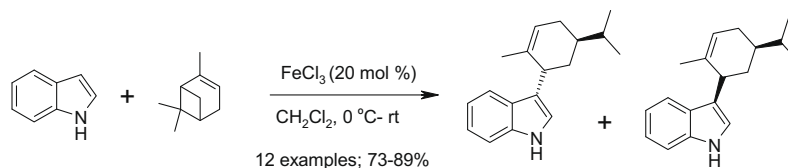


A facile synthesis of 2'-deoxy- β -ribonucleosides from 3'-*O*-(*N*-acetyl)-glycyl-protected 2'-deoxyribofuranose has been developed. The coupling reactions between the protected 2'-deoxyribose and silylated bases exhibited β -selectivity up to 98% presumably via a 1',3'-participation mechanism. The 3'-directing group can be introduced and removed easily under mild conditions. This approach provides an efficient and highly stereoselective entry for the synthesis of 2'-deoxy-ribonucleosides.

First example of FeCl₃-catalyzed alkylation of indoles with pinenes

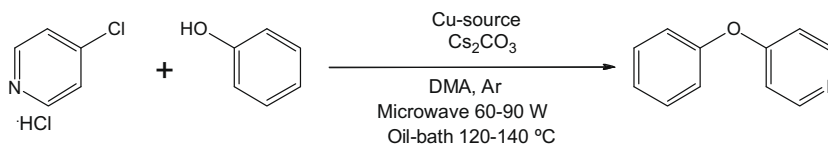
pp 244–247

J. S. Yadav*, B. V. Subba Reddy, G. Narasimhulu, N. Sivasankar Reddy, P. Narayana Reddy, K. V. Purnima, P. Naresh, B. Jagadeesh

**Copper(0) in the Ullmann heterocycle-aryl ether synthesis of 4-phenoxy pyridine using multimode microwave heating**

pp 248–251

Faysal Benaskar, Volker Engels, Narendra Patil, Evgeny V. Rebrov, Jan Meuldijk, Volker Hessel, Lumbertus A. Hulshof, David A. Jefferson, Jaap. C. Schouten*, Andrew E. H. Wheatley*

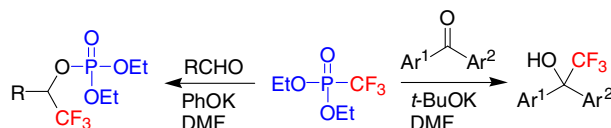


The action of nanoparticulate copper catalysts with a mean particle size of 10 nm in the Ullmann ether synthesis is reported using multimode microwave heating and employing stable chloropyridine salts and unactivated phenol, with stabilized copper nanoparticles outperforming other copper catalysts in terms of stability and reusability.

**Alkoxide-induced nucleophilic trifluoromethylation using diethyl trifluoromethylphosphonate**

pp 252–255

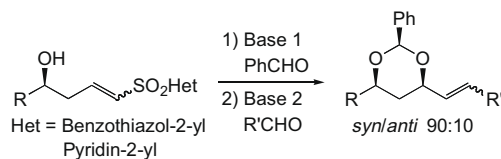
Prabhakar Cherkupally, Petr Beier*



A two-step synthesis of allylic *syn* 1,3-diols via an intramolecular oxa-Michael reaction followed by a modified Julia olefination

pp 256–258

Raphaël Oriez, Joëlle Prunet*

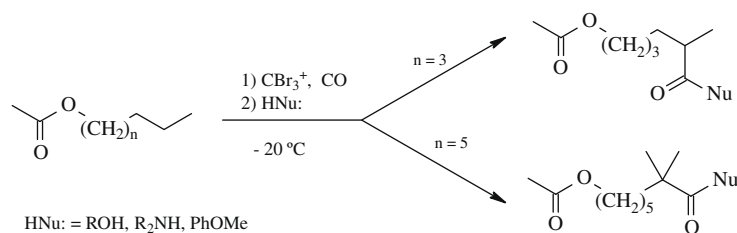


A two-step process for the synthesis of allylic *syn* 1,3-diols is developed. An intramolecular oxa-Michael reaction onto vinyl heteroaryl sulfones allows the diastereoselective formation of 1-sulfonyl 2,4-diols protected as benzylidene acetals. These sulfones are then engaged in a modified Julia olefination to furnish the olefins contiguous to the benzylidene acetal ring with good *E/Z* selectivity.

The first 'alkane-like' functionalization of *n*-alkyl acetates: a new method for one-pot selective syntheses of bifunctional aliphatic compounds with an acetate group

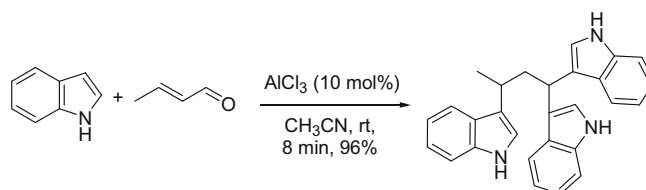
pp 259–263

Alexander V. Orlinkov, Nikolai D. Kagramanov, Pavel V. Petrovskii, Irena S. Akhrem*


AlCl₃ as a powerful catalyst for the one-pot preparation of 1,1,3-triheteroaryl compounds

pp 264–268

Morteza Shiri*, Mohammad Ali Zolfigol*, Roya Ayazi-Nasrabadi

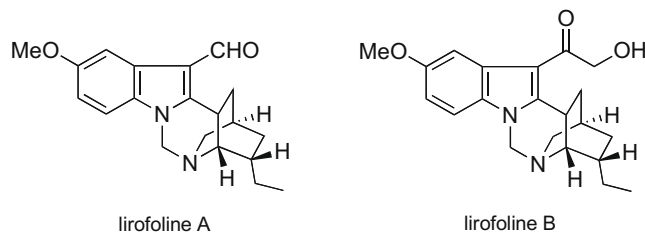


A general and efficient procedure for the synthesis of 1,1,3-triheteroaryl compounds is developed.


Structure, biological activity, and a biomimetic partial synthesis of the lirofolines, novel pentacyclic indole alkaloids from *Tabernaemontana*

pp 269–272

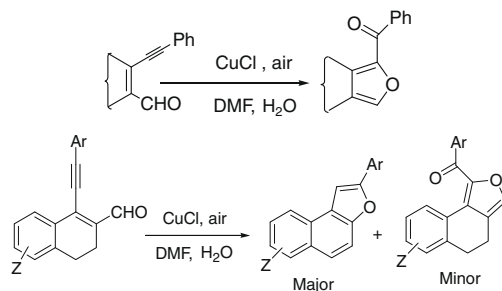
Yun-Yee Low, Kuan-Hon Lim, Yeun-Mun Choo, Huey-Shen Pang, Tadahihiro Etoh, Masahiko Hayashi, Kanki Komiyama, Toh-Seok Kam*



Copper-catalyzed addition of water affording highly substituted furan and unusual formation of naphthofuran ring from 3-(1-alkenyl)-2-alkene-1-al

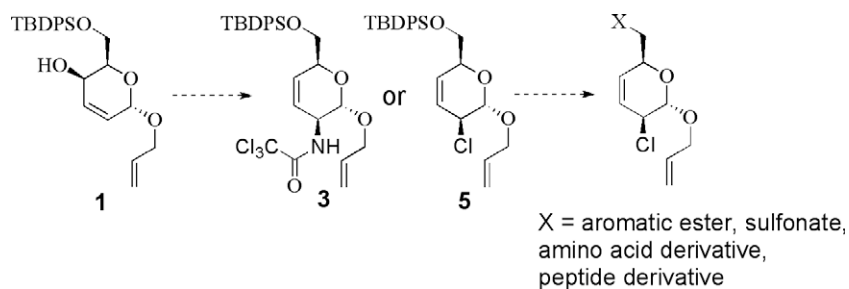
pp 273–276

Rathin Jana, Sunanda Paul, Anup Biswas, Jayanta K. Ray *


Synthesis and applications of a chiral-oxygenated 3-chloro-3,6-dihydro-2H-pyran obtained under Overman rearrangement conditions

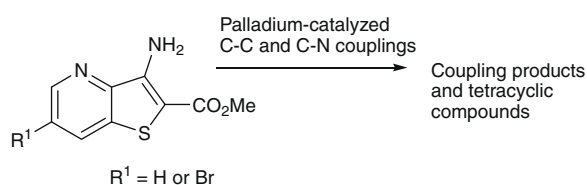
pp 277–280

Ana Montero, Esperanza Benito, Bernardo Herradón *


Synthesis of new thieno[3,2-*b*]pyridine derivatives by palladium-catalyzed couplings and intramolecular cyclizations

pp 281–283

Ricardo C. Calhelha, Maria-João R. P. Queiroz *

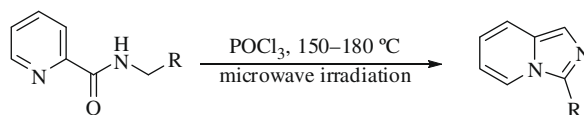


Two precursors in the thieno[3,2-*b*]pyridine series were prepared and used as components in C–C and C–N Pd-catalyzed couplings. The reaction with 2-bromopyridine gave tetracyclic compounds.

Microwave-assisted organic synthesis of 3-substituted-imidazo[1,5-*a*]pyridines

pp 284–286

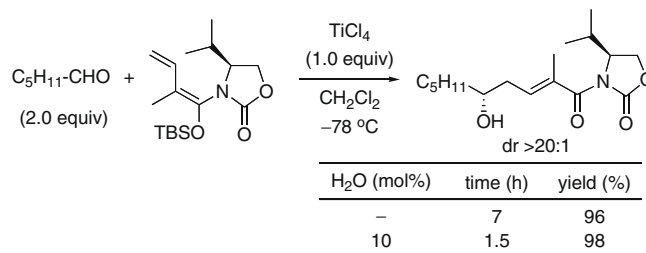
Venkata Satyanarayana Arvapalli, Guangwu Chen, Sergey Kosarev, Meifen Evonne Tan, Dejian Xie, Larry Yet *



Rate enhancement by water in a TiCl₄-mediated stereoselective vinylogous Mukaiyama aldol reaction

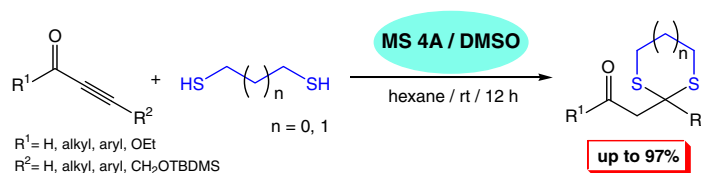
pp 287–289

Makoto Yamaoka, Atsuo Nakazaki, Susumu Kobayashi *

**Double Michael addition of dithiols to acetylenic carbonyl compounds under the influence of molecular sieve and dimethyl sulfoxide**

pp 290–292

Tomoko Kakinuma, Takeshi Oriyama *

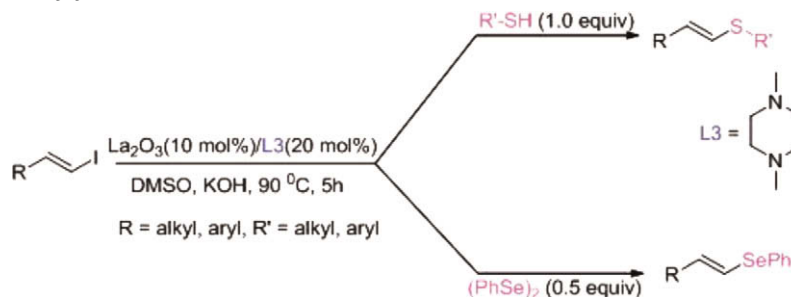


Double Michael addition of 1,3-propanedithiol to α,β -acetylenic carbonyl compounds in the presence of molecular sieve and dimethyl sulfoxide proceeds very smoothly to afford the corresponding β -keto 1,3-dithianes in high yields.

Lanthanum-catalyzed stereoselective synthesis of vinyl sulfides and selenides

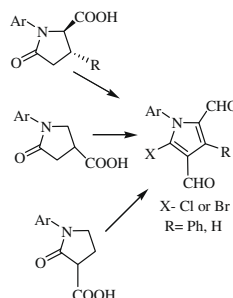
pp 293–296

V. Prakash Reddy, K. Swapna, A. Vijay Kumar, K. Rama Rao *

**A novel access to bisformylated pyrroles via decarboxylation of N-aryl- γ -lactam-carboxylic acids under Vilsmeier reaction conditions**

pp 297–300

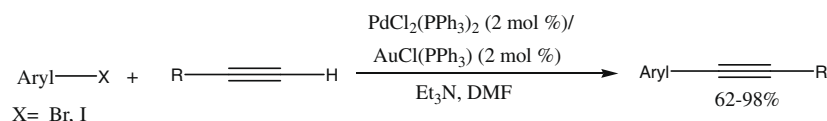
Gopa Barman, Jayanta K. Ray *



On the catalytic duo PdCl₂(PPh₃)₂/AuCl(PPh₃) that cannot effect a Sonogashira-type reaction: a correction

pp 301–305

Biswajit Panda, Tarun K. Sarkar *

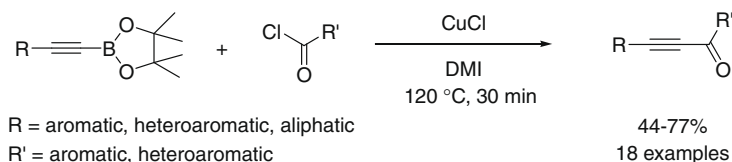


In contrast to the observation made by the Laguna group, we report that the combination of PdCl₂(PPh₃)₂ and AuCl(PPh₃) makes a unique catalytic system that allows Sonogashira-type cross-coupling of both aryl and alkyl alkynes with aryl halides in excellent yields.

**Palladium- and base-free synthesis of conjugated ynones by cross-coupling reactions of alkynylboronates with acid chlorides mediated by CuCl**

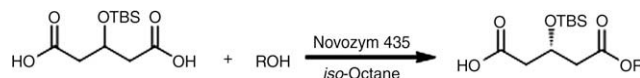
pp 306–308

Yasushi Nishihara *, Daisuke Saito, Eiji Inoue, Yoshiaki Okada, Mikihiro Miyazaki, Yoshiaki Inoue, Kentaro Takagi

**Enzymatic synthesis of (S)-glutamic acid monoesters aided by molecular docking**

pp 309–312

Bo Wang, Ji Liu, Xiaoling Tang, Cheng Cheng, Jiali Gu, Liyan Dai *, Hongwei Yu *



An efficient enzymatic method for the synthesis of (S)-3-substituted glutamic acid monoesters which was aided by molecular docking has been described. The reaction was proceeded under mild conditions, and the desired products were afforded with up to 98% ee in the yield of 93%. The results demonstrate that molecular docking is efficient to facilitate selection of substrates in enzymatic reaction.

**A simplified [¹¹C]phosgene synthesis**

pp 313–316

Yann Bramoullé, Dirk Roeda *, Frédéric Dollé

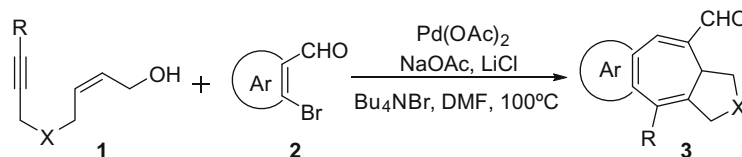


A simplified [¹¹C]phosgene synthesis method is proposed. [¹¹C]Phosgene is obtained in 30–35% yield relative to [¹¹C]methane, in a process taking 12–13 min from the end of carbon-11 production.

Palladium-catalyzed cyclization of 1,6-enyne with 2-bromoarylaldehyde: domino sequence to [5-7-6] tricyclic ring systems

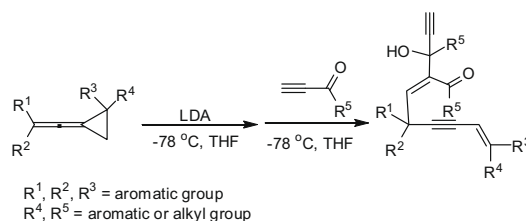
pp 317–320

Xianjie Fang, Xiaofeng Tong *

**LDA-mediated domino carbolithiation reactions of vinylidenecyclopropanes with but-3-yn-2-one and 1-phenylprop-2-yn-1-one**

pp 321–324

Bei-Li Lu, Jian-Mei Lu, Min Shi *

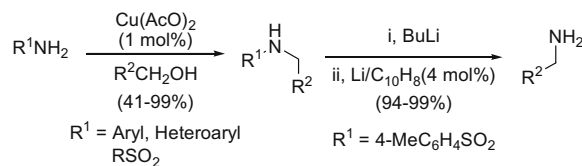


A novel domino carbolithiation reaction of vinylidenecyclopropanes with but-3-yn-2-one and 1-phenylprop-2-yn-1-one by treating with LDA in THF has been disclosed in this Letter, providing the corresponding domino adducts in moderate to good yields.

**N-Alkylation of poor nucleophilic amine and sulfonamide derivatives with alcohols by a hydrogen autotransfer process catalyzed by copper(II) acetate**

pp 325–327

Ana Martínez-Asencio, Diego J. Ramón *, Miguel Yus *

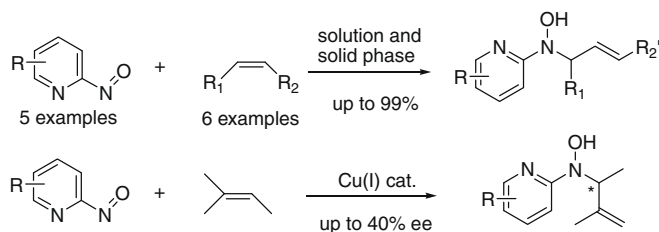


A practical and cheap procedure for the monoalkylation of amines and sulfonamides is presented. The further deprotection of alkylated sulfonamides gave the corresponding primary amines with excellent yields.

Iminonitroso ene reactions: experimental studies on reactivity, regioselectivity, and enantioselectivity

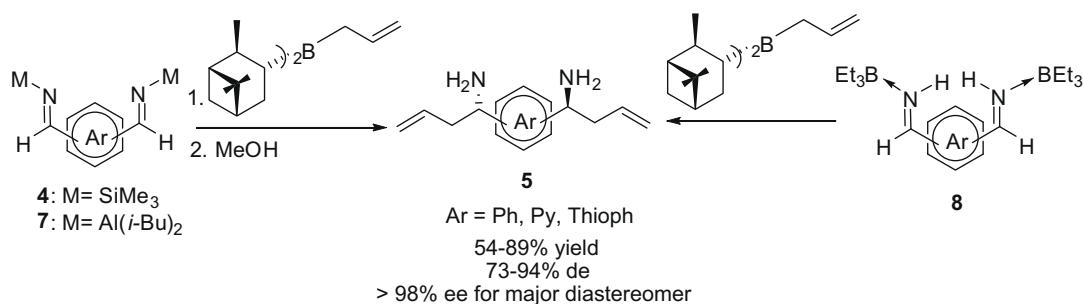
pp 328–331

Baiyuan Yang, Marvin J. Miller *

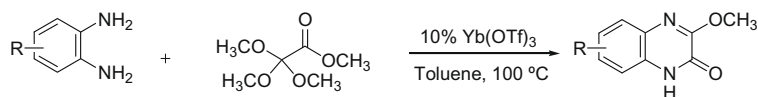


Efficient synthesis of chiral C₂-symmetric diamines via allylboration of bis-*N,N*-metalloidimines

pp 332–336

P. Veeraraghavan Ramachandran^{*}, Debanjan Biswas, Marek P. Krzeminski, Guang-Ming Chen**Synthesis of 3-methoxy-quinoxalin-2-ones from methyl trimethoxyacetate and phenylenediamines**

pp 337–339

Jennifer D. Venable^{*}, David E. Kindrachuk, Matthew L. Peterson, James P. Edwards

Treatment of phenylenediamines with methyl trimethoxyacetate led to the formation of 3-methoxy-quinoxalin-2-ones with the assistance of lanthanide-based Lewis acids.

**Oxidative bromination reaction using vanadium catalyst and aluminum halide under molecular oxygen**

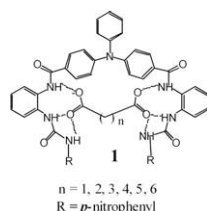
pp 340–342

Kotaro Kikushima, Toshiyuki Moriuchi^{*}, Toshikazu Hirao^{*}

Vanadium-catalyzed bromination reaction of various arenes, alkenes, and alkynes under molecular oxygen was performed in the presence of AlBr₃ to give the bromination products selectively in high yields.

**Triphenylamine-based receptor for selective recognition of dicarboxylates**

pp 343–347

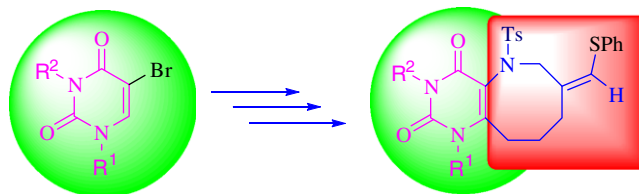
Kumaresh Ghosh^{*}, Indrajit Saha, Goutam Masanta, Evan B. Wang, Carol A. Parish^{*}

A new triphenylamine-based receptor **1** has been designed and synthesized for the recognition of aliphatic dicarboxylates of various chain lengths. The receptor **1** is found to bind the dicarboxylates with moderate binding strength under a semi rigid, propeller-shaped, fluorescent triphenylamine spacer. The binding behavior was studied in CH₃CN using ¹H NMR, fluorescence, and UV–vis spectroscopic methods. The conformational behavior of **1** and its complexation modes have been investigated using classical and quantum mechanical theoretical methods. The receptor is found to be selective for long chain substrate.



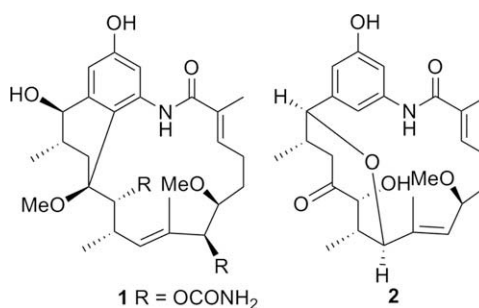
An easy access to pyrimidine-fused azocine derivatives by thiophenol-mediated radical cyclization via 8-endo-trig mode

pp 348–350

K. C. Majumdar^{*}, Shovan Mondal, Debankan Ghosh

New tricyclic geldanamycin analogues from an engineered strain of *Streptomyces hygroscopicus* JCM4427

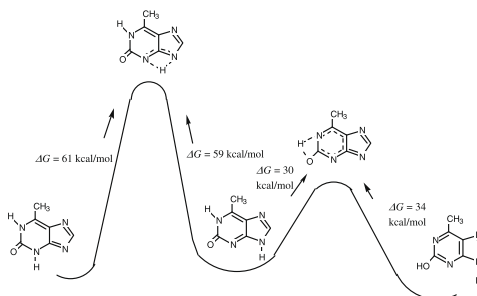
pp 351–353

Seong Su Hong, Xing Fu Cai, Bang Yeon Hwang, Hong Sub Lee, Bao-Ning Su, Young-Soo Hong^{*}, Dongho Lee^{*}Two novel tricyclic geldanamycin analogues, DHQ5 (1) and DHQ6 (2), were isolated from an engineered strain of *Streptomyces hygroscopicus*.

Theoretical study of three predominant tautomers of 2-oxo-6-methylpurine and their two transition state structures

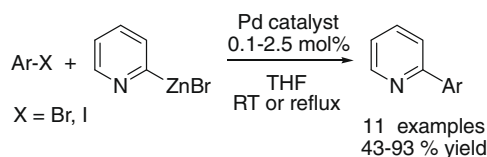
pp 354–356

Jong Hwa Kim



Negishi coupling of 2-pyridylzinc bromide—paradigm shift in cross-coupling chemistry?

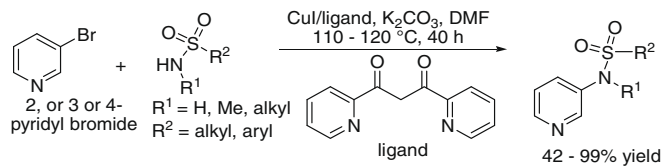
pp 357–359

Brian M. Coleridge, Charles S. Bello, David H. Ellenberger, Andreas Leitner^{*}

Cross coupling of 3-bromopyridine and sulfonamides ($R^1NHSO_2R^2$; $R^1 = H, Me, alkyl$; $R^2 = alkyl$ and aryl)

pp 360–362

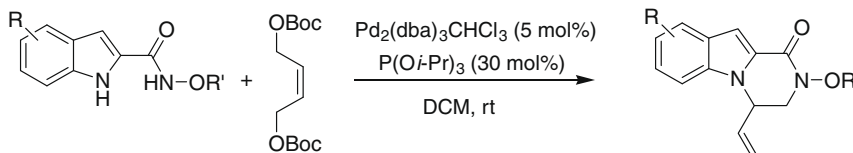
Xiaojun Han



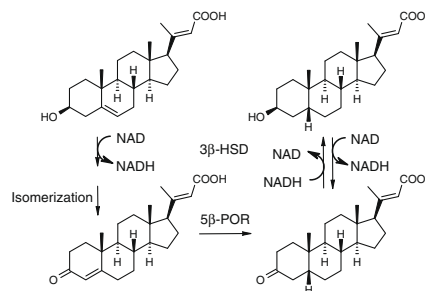
N-(3-Pyridinyl)-substituted secondary and tertiary sulfonamides have been synthesized in good to excellent yields by the reaction of 3-bromopyridine with primary and secondary alkyl and aryl sulfonamides (MeSO₂NH₂, MeSO₂NHMe, TolSO₂NH₂, TolSO₂NHMe, 1,3-propanesultam, and 1,4-butanessultam), catalyzed by CuI /1,3-di(pyridin-2-yl)propane-1,3-dione with K₂CO₃ in DMF at 110–120 °C over 36–40 h. 2-Bromopyridine, 4-bromopyridine, and a wide variety of substituted phenyl bromides can also be successfully coupled with sulfonamides under these reaction conditions.


Palladium-catalyzed double allylic alkylation of indole-2-hydroxamates: easy access to pyrazino[1,2-*a*]indole derivatives

pp 363–366

Sébastien Laliberté^{*}, Peter K. Dornan, Austin Chen
Norcholanic acids as substrates for recombinant 3 β -hydroxysteroid dehydrogenase and progesterone 5 β -reductase, enzymes of the 5 β -cardenolide biosynthesis

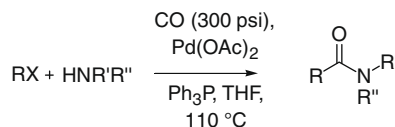
pp 367–370

Pia Schebitz, Lars Nothdurft, Andreas Hensel, Frieder Müller-Urri, Wolfgang Kreis^{*}

Norcholanic acids are substrates of two enzymes supposed to be involved in cardenolide biosynthesis.


One-pot amide synthesis from allyl or benzyl halides and amines by Pd-catalysed carbonylation

pp 371–373

Luigino Troisi^{*}, Catia Granito, Francesca Rosato, Valeria Videtta

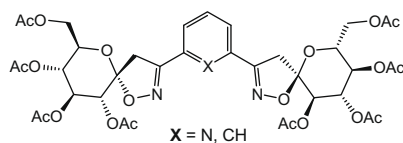
R = allyl, benzyl; X = Cl, Br;
R' = alkyl, aryl; R'' = H, alkyl, aryl.

Amides can be prepared from allyl or benzyl halides and primary or secondary amines, using Pd(0) catalyst under CO pressure, in a one-pot synthesis.

Carbohydrate-based spiro bis(isoxazolines): synthesis and evaluation in asymmetric catalysis

pp 374–377

David Goyard, Susanne M. Telligmann, Catherine Goux-Henry, Mike M. K. Boysen, Eric Framery, David Gueyraud, Sébastien Vidal *

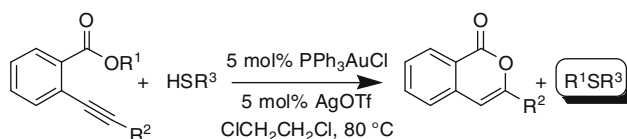


Two carbohydrate-based spiro bis(isoxazolines) were synthesized and evaluated as ligands for enantioselective reactions in Pd-catalyzed Tsuji–Trost allylic alkylation and Cu(I)-catalyzed alkylation of imine. While the presence of the palladium caused the rearrangement of the ligand, the Cu(I)-catalysis afforded the desired product in good yield and with modest enantioselectivity.

**Gold-catalyzed C–S bond formation from thiols**

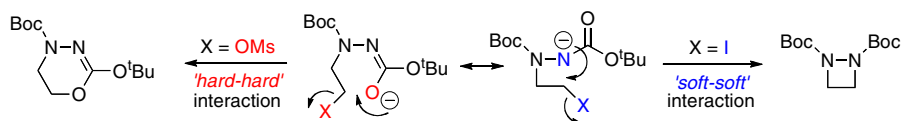
pp 378–381

Mickaël Jean, Jacques Renault, Pierre van de Weghe *, Naoki Asao

**Critical importance of leaving group ‘softness’ in nucleophilic ring closure reactions of ambident anions to 1,2-diazetidines**

pp 382–384

Michael J. Brown, Guy J. Clarkson, David J. Fox, Graham G. Inglis, Michael Shipman *

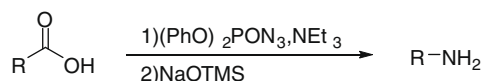


Normal kinetic preference for six-membered ring formation can be overcome in difficult ring closures to 1,2-diazetidines by consideration of Hard Soft Acids and Bases principle.

**A modified Curtius reaction: an efficient and simple method for direct isolation of free amine**

pp 385–386

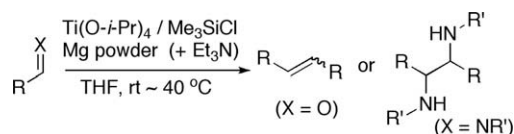
Bin Ma *, Wen-Cheng Lee *



The Curtius reaction was modified with a NaOTMS-mediated hydrolysis of the isocyanate intermediate. The free amine can be isolated directly by this simple method.

McMurry coupling of aryl aldehydes and imino pinacol coupling mediated by Ti(O-*i*-Pr)₄/Me₃SiCl/Mg reagent

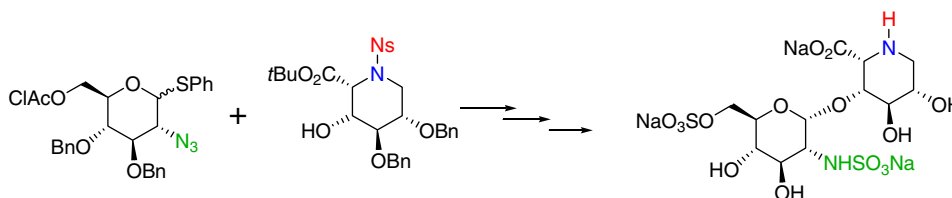
pp 387–390

Sentaro Okamoto^{*}, Jing-Qian He, Chihaya Ohno, Yuhji Oh-iwa, Yuhki Kawaguchi

Ti(O-*i*-Pr)₄/Me₃SiCl/Mg reagent mediated McMurry coupling of aryl aldehydes to biaryl olefins at near room temperature and the reagent also coupled aldimines to 1,2-diamines (imino pinacol coupling).

The 4-nitrobenzenesulfonyl group as a convenient N-protecting group for iminosugars—synthesis of oligosaccharide inhibitors of heparanase

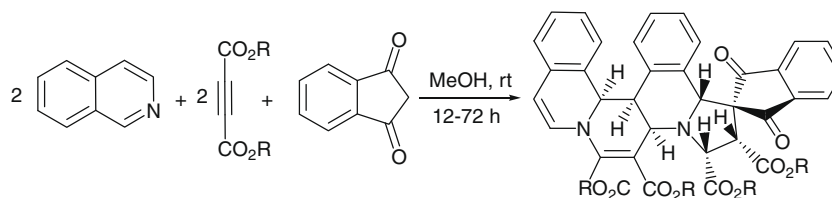
pp 391–395

Zsuzsánna Csíki, Péter Fügedi^{*}

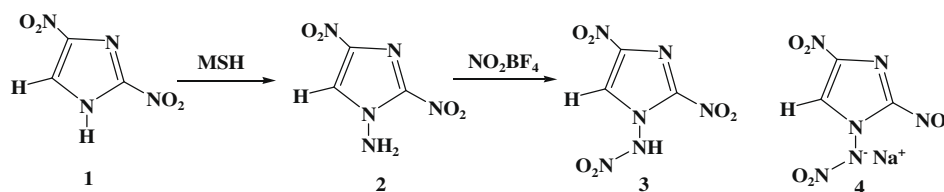
The 4-nitrobenzenesulfonyl group can be used advantageously for the protection of the ring nitrogen atom of iminosugars. This is demonstrated by the synthesis of oligosaccharide inhibitors of heparanase.

**Diastereoselective synthesis of spiro-functionalized tetraalkyl benzoisoquinopyrrolonaphthyridine-tetracarboxylates from isoquinoline, dialkyl acetylenedicarboxylates, and indane-1,3-dione**

pp 396–398

Issa Yavari^{*}, Anvar Mirzaei, Loghman Moradi, Gholamhossein Khalili**Synthesis of *N*-amino- and *N*-nitramino-nitroimidazoles**

pp 399–401

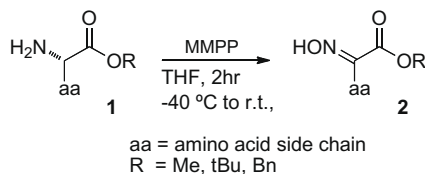
Raja Duddu^{*}, Paritosh R. Dave, Reddy Damavarapu, Nathaniel Gelber, Damon Parrish

Synthesis of a new nitro group- possessing 1-amino and 1-nitraminoimidazoles is described.

A simple method for the oxidation of α -amino acid esters to α -oximino esters

pp 402–403

Lisa Y. Wu, Joseph K. Choi, Krit Y. Hatton, Clifford E. Berkman *



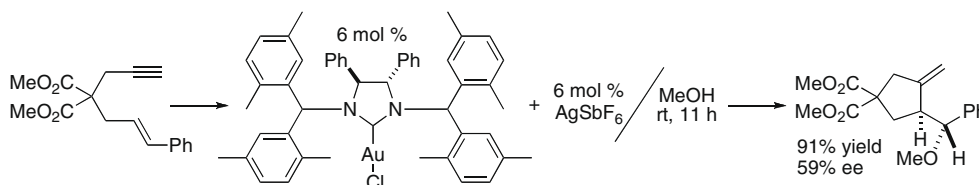
Magnesium bis(monoperoxyphthalate) (MMPP) was found to be an effective reagent for the oxidation of various α -amino acid esters to the corresponding α -oximino acid esters.



Chiral carbene approach to gold-catalyzed asymmetric cyclization of 1,6-enynes

pp 404–406

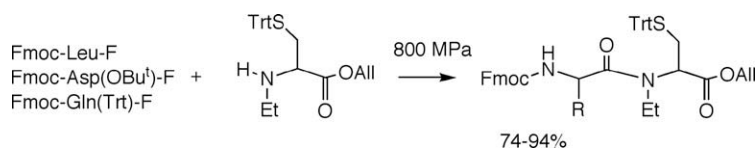
Yasumasa Matsumoto, Khalid B. Selim, Hirotsugu Nakanishi, Ken-ichi Yamada, Yasutomo Yamamoto, Kiyoshi Tomioka *



High-pressure-promoted Fmoc-aminoacylation of *N*-ethylcysteine: preparation of key devices for the solid-phase synthesis of peptide thioesters

pp 407–410

Yuko Nakahara, Ichiro Matsuo, Yukishige Ito, Risa Ubagai, Hironobu Hojo *, Yoshiaki Nakahara *



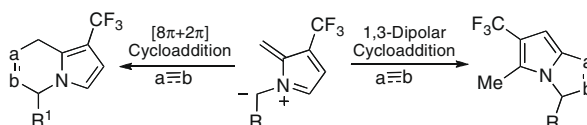
We efficiently synthesized an Fmoc-aminoacyl NAC device for solid-phase synthesis of peptide thioesters by a high-pressure reaction, achieving an improvement in the overall yield.



Cycloaddition of trifluoromethyl azafulvenium methides: synthesis of new trifluoromethylpyrrole-annulated derivatives

pp 411–414

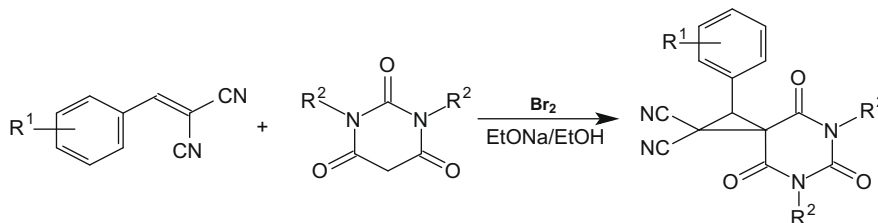
Cláudio M. Nunes, Manuela Ramos Silva, Ana Matos Beja, Rui Fausto, Teresa M. V. D. Pinho e Melo *



The first example of the cascade assembly of a spirocyclopropane structure: direct transformation of benzylidenemalononitriles and *N,N*-dialkylbarbituric acids into substituted 2-aryl-4,6,8-trioxo-5,7-diazaspiro[2.5]octane-1,1-dicarbonitriles

pp 428–431

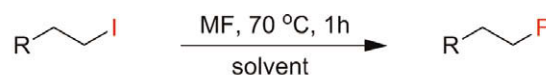
Michail N. Elinson ^{*}, Anatolii N. Vereshchagin, Nikita O. Stepanov, Tatiana A. Zaimovskaya, Valentina M. Merkulova, Gennady I. Nikishin



Facile nucleophilic fluorination of primary alkyl halides using tetrabutylammonium fluoride in a *tert*-alcohol medium

pp 432–434

Dong Wook Kim ^{*}, Hwan-Jeong Jeong, Seok Tae Lim, Myung-Hee Sohn



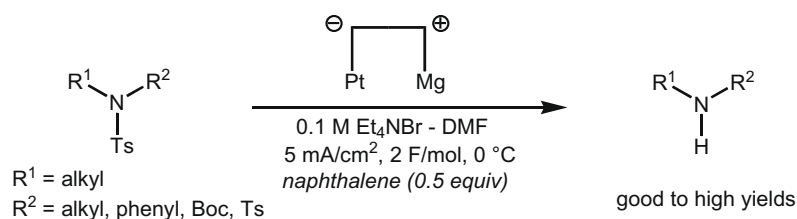
MF	solvent	yield (%)
TBAF	CH ₃ CN	37% TM, 57% olefin
CsF	<i>t</i> -amyl alcohol	5% TM, 93% SM
TBAF	<i>t</i> -amyl alcohol	76% TM, 19% olefin

Nonpolar protic reaction media such as *t*-amyl alcohol allow the aliphatic, nucleophilic fluorination reaction of primary haloalkane systems to fluoroalkanes, using tetrabutylammonium fluoride (TBAF), to proceed chemo-selectively at a reasonable reaction rate under mild conditions to afford the fluoro-product in high yield. As an example, the nucleophilic fluorination of 2-(3-iodopropoxy)naphthalene (**1a**) as the primary haloalkane model compound, with TBAF in acetonitrile as a polar aprotic solvent, CsF in *t*-amyl alcohol as a nonpolar protic solvent, and TBAF in *t*-amyl alcohol for 1 h provided 2-(3-fluoropropoxy)naphthalene (**2a**) in 38, 5, and 76% yields, respectively.

Hg cathode-free electrochemical detosylation of *N,N*-disubstituted *p*-toluenesulfonamides: mild, efficient, and selective removal of *N*-tosyl group

pp 435–438

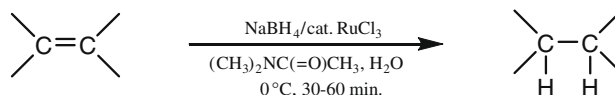
Hisanori Senboku ^{*}, Kazuo Nakahara, Tsuyoshi Fukuhara, Shoji Hara



A convenient methodology for the chemoselective reduction of a wide variety of functionalized alkenes

pp 439–441

James H. Babler ^{*}, Nicholas A. White

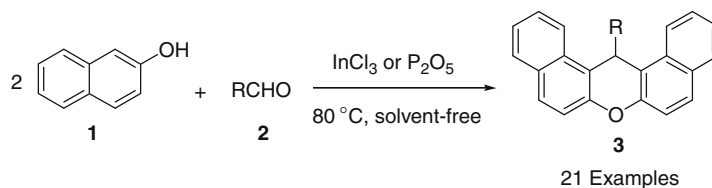


The above conditions represent an efficient method for chemoselective reduction of alkenes (including trisubstituted olefins) possessing various sensitive and/or reducible groups.

A facile approach for the synthesis of 14-aryl- or alkyl-14H-dibenzo[*a,j*]xanthenes under solvent-free condition

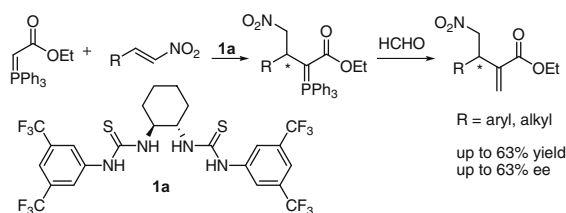
pp 442–445

Ram Kumar, Ganesh Chandra Nandi, Rajiv Kumar Verma, M. S. Singh *

**Asymmetric organocatalytic Michael-type reaction of phosphorus ylides to nitroolefins: synthesis of γ -nitro- β -aryl- α -methylene carboxylic esters**

pp 446–448

Suresh Allu, Sermadurai Selvakumar, Vinod K. Singh *



We report, for the first time, asymmetric organocatalytic Michael-type addition of stabilized phosphorus ylides to nitroolefins mediated by bistiourea catalyst. Its subsequent reaction with formaldehyde provides γ -nitro- α -methylene carboxylic esters in moderate to good yields and enantioselectivities (up to 63% ee).

Synthesis, crystal structures and photochromic properties of novel chiral Schiff base macrocycles

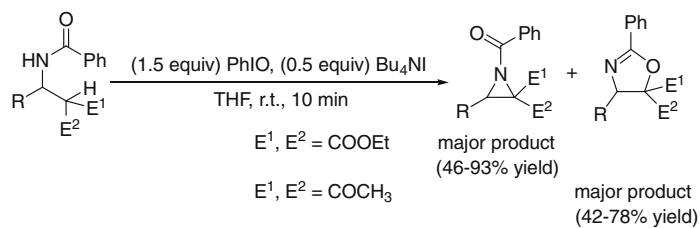
pp 449–452

Koichi Tanaka *, Ryota Shimoura, Mino R. Caira *

**PhIO/ Bu_4NI mediated oxidative cyclization of amidoalkylation adducts for the synthesis of *N*-benzoyl aziridines and oxazolines**


pp 453–456

Renhua Fan *, Hua Wang, Yang Ye, Jianhong Gan *



OTHER CONTENT**Corrigendum****p 457**

*Corresponding author

+ Supplementary data available via ScienceDirect

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