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Enantioselective Rhodium-Catalyzed Allylic Alkylation of β,γ-Unsaturated α-Amino Nitriles: Synthetic Homoenolate Equivalents

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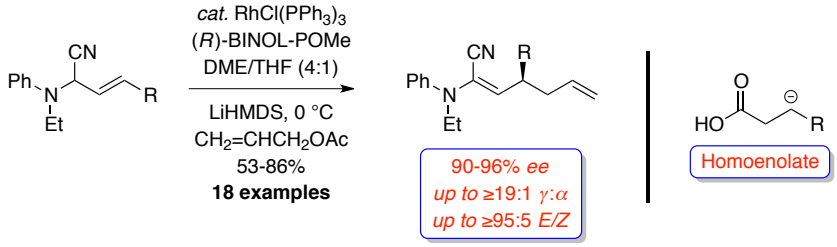
Angew. Chem. Int. Ed. **2019**, *58*, 1–6. **DOI:** 10.1002/anie.201900442



Abstract: An enantioselective rhodium-catalyzed allylic alkylation of β,γ-unsaturated α-amino nitriles is described. This protocol provides a novel approach for the construction of β-stereogenic carbonyl derivatives *via* the catalytic asymmetric alkylation of a homoenolate equivalent. The particularly challenging nature of this transformation is highlighted by the fact that *three* modes of selectivity must be manipulated, namely regio- and enantioselectivity, in addition to geometrical control. The γ-stereogenic cyanoenamine products can be readily hydrolyzed *in situ* to afford the β-substituted carboxylic acids, which in turn provide expedient access to a number of related carbonyl derivatives. In addition, control experiments indicate that the chiral rhodium-allyl intermediate facilitates the selective formation of the *E*-cyanoenamine products, which is critical since the *Z*-isomer affords significantly lower enantiocontrol. As a consequence, garnering excellent *E*-selectivity in the alkylation step is vital for the development of a practical process.

Sequential Cu-Catalyzed Four- and Five-Component Syntheses of Luminescent 3-Triazolylquinoxalines

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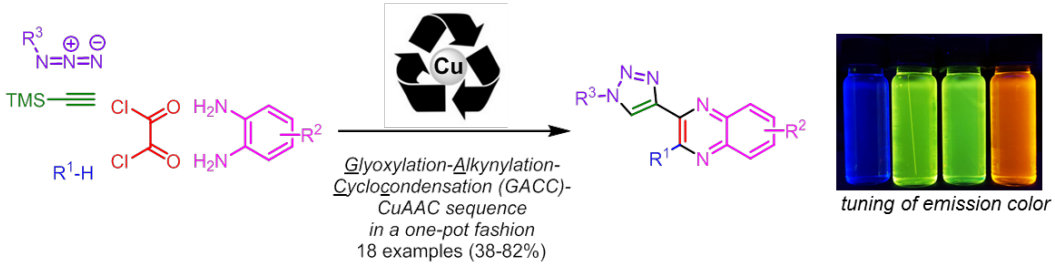
Chem. Eur. J. **2019**, *25*, 9447–9455. **DOI:** 10.1002/chem.201900277



Abstract: 3-Triazolylquinoxalines can be readily synthesized by applying two complementary synthetic protocols starting from heterocyclic π nucleophiles or (hetero)aryl glyoxylic acids in a consecutive four- or five-component reaction. Conceptually, the sequential use of a single cuprous salt for alkynylation and Cu-catalyzed alkyne-azide cycloaddition (CuAAC) in a one-pot fashion sets the stage for activation-alkynylation-cyclocondensation-CuAAC or glyoxylation-alkynylation-cyclocondensation-CuAAC sequences in good yields. The diversity-oriented generation of differently substituted 3-triazolylquinoxalines is an excellent entry to tunable emission solvatorchromic fluorophores with triazole ligation. The electronic structure, corroborated by DFT and TD-DFT calculations, rationalizes the charge transfer character of relevant absorptions and large Stokes shifts as well as the electronic innocence of the triazole substituents.

Game of Isomers: Bifurcation in the Catalytic Formation of Bis[1]benzothieno[1,4]thiazines with Conformation-Dependent Electronic Properties

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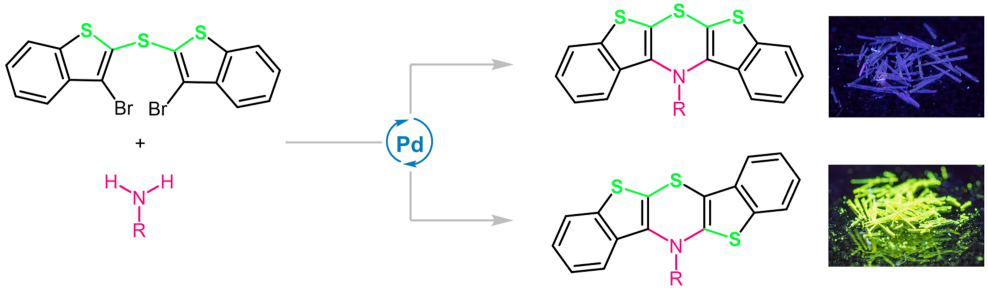
J. Org. Chem. **2019**, *84*, 5582–5595. **DOI:** 10.1021/acs.joc.9b00517



Abstract: Two regioisomers of bis[1]benzothieno[1,4]thiazine are unexpectedly obtained by tuning the catalytic conditions of the intermolecular–intramolecular Buchwald–Hartwig amination. Mechanistic insights and evidence of intermediates support a conclusive mechanistic rationale. Furthermore, a computationally based study on the influence of conformational aspects on the HOMO energy level of anellated 1,4-thiazine paves the way to enhance the electronic properties, thus successfully achieving higher luminescent and easier oxidizable *syn–syn* bis[1]benzothieno[1,4]thiazines.

Supporting-Electrolyte-Free Electrochemical Methoxymethylation of Alcohols Using a 3D-Printed Electrosynthesis Continuous Flow Cell System

Carlo G. W. van Melis, Matthew R. Penny, Anthony D. Garcia, Alessia Petti, Adrian P. Dobbs, Stephen T. Hilton,* and Kevin Lam* (k.lam@greenwich.ac.uk or s.hilton@ucl.ac.uk)

ChemElectroChem **2019**, *6*, 4144–4148. **DOI:** 10.1002/celc.201900815

Abstract: We describe the development of a novel low-cost small-footprint 3D-printed electrosynthesis continuous flow cell system that was designed and adapted to fit a commercially available Electrasyn 2.0. The utility and effectiveness of the combined flow/electrochemistry system over the batch process was demonstrated in the development of an improved and supporting- electrolyte-free version of our anodic methoxymethylation of alcohols.

Chemistry of Polydopamine – Scope, Variation, and Limitation

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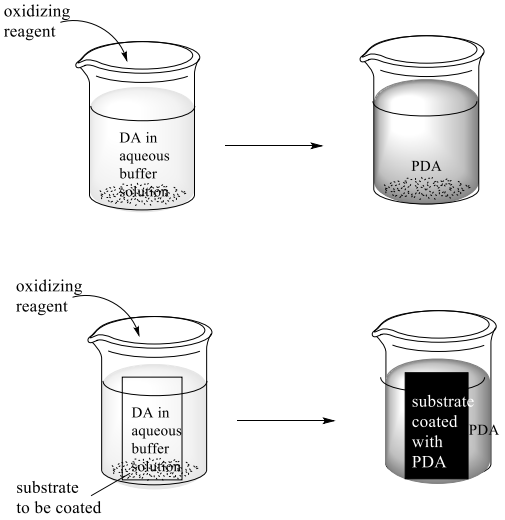
Eur. J. Org. Chem. **2019**, 4976–4994. **DOI:** 10.1002/ejoc.201900445



Abstract: Polydopamine (PDA) is a polymer easily obtained by oxidation of dopamine. It is composed of indole and dopamine units in various oxidation states and to a lesser extent of pyrroles. It adheres to all type of surfaces even under water due to its abundant catechol moieties assisted by amino groups. This property together with a widespread reactivity to nucleophiles and electrophiles allowing linkage of a variety of entities renders PDA extremely interesting for various applications in biology, biomedicine, membranes, catalysis, materials and water purification. The field of PDA is violently developing. The present review gives an overview about the chemistry and properties of PDA and its analogues with the focus on recent publications. Their widespread applications are occasionally touched. Analogues are obtained by two strategies: post-modification of PDA and oxidative polymerization of dopamine analogues. Scope and limitations of these strategies are worked out giving impulses for future research in the field.

Environmentally-Benign Glycosylation Reaction Using Odorless *Thio*-Glycosides and Hypervalent Iodine(III) Reagent

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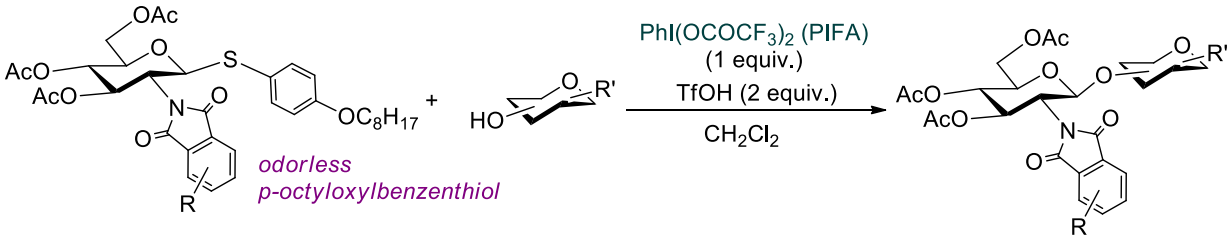
Heterocycles **2019**, *99*, 680–693. **DOI:** 10.3987/COM-18-S(F)35

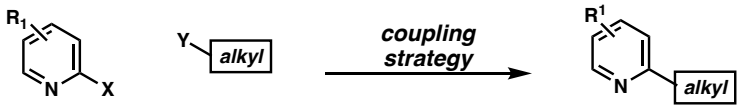


Abstract: We discovered that the hypervalent iodine(III) reagent could mediate the glycosylation reaction by activating the thio-glycoside donors which were prepared from glycosyl 1-*O*-acetate and odorless *p*-octyloxybenzenethiol. By using this method, trisaccharides as well as disaccharides could be easily synthesized under mild reaction conditions. All the chemicals employed in this method are enviromentally-benign.

Catalytic Strategies to Convert 2-Halopyridines to 2-Alkylpyridines

J. Miles Blackburn and Jennifer L. Roizen* (j.roizen@duke.edu)
Asian J. Org. Chem. **2019**, *8*, 920–930. **DOI:** 10.1002/ajoc.201900163

This is an invited submission for the Special Issue on Heterocyclic Chemistry with Guest Editors Takashi Ooi, Oliver Reiser, Chris Vanderwal, and Andrew Smith.



2-halopyridine	alkyl component	coupling strategy
2-fluoropyridine 2-chloropyridine 2-bromopyridine 2-iodopyridine	alkylmagesium alkylzinc alkylboron alkylstannane alkyl bromide radical precursor alkene	traditional cross-coupling cross-electrophile coupling dual nickel/photoredox catalysis photoredox catalysis

Abstract: Over the past decade, improvements in synthetic technologies have increased the feasibility and practicality of the preparation of 2-alkylpyridines from 2-halopyridines. Advances in iron-, nickel-, and palladium-catalysis have increased efficiency in the access of 2-alkylpyridines with traditional cross-coupling approaches. Additionally, the emergence of cross-electrophile coupling reactions and photoredox catalysis strategies have proven to be enabling technologies for the synthesis of 2-alkylpyridines. Nevertheless, these developments reveal remaining opportunities for more efficient, mild, and straightforward methods to access a broader range of 2-alkylpyridines from 2-halopyridines.

Multilayer *3D* Chirality and Its Synthetic Assembly

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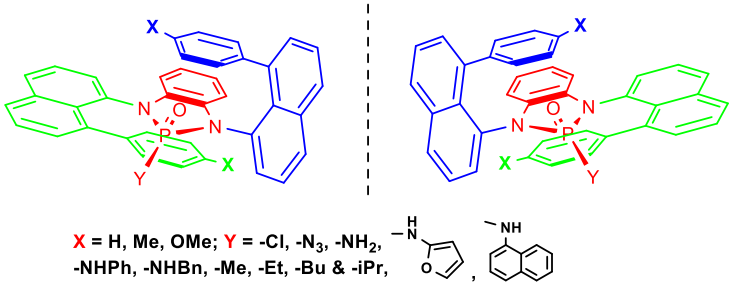
Research **2019**, *2019*, ArticleID: 6717104, 1–11. **DOI:** 10.34133/2019/6717104



Individual isomers of multi-layer *3D* molecules

Abstract: *3D* chirality of sandwich type of organic molecules has been discovered. The key element of this chirality is characterized by three layers of structures that are arranged nearly in parallel fashion with one on top and one down from the center plane. Individual enantiomers of these molecules have been fully characterized by spectroscopies with their enantiomeric purity measured by chiral HPLC. The absolute configuration was unambiguously assigned by X-ray diffraction analysis. This is the first multi-layer *3D* chirality reported, and is anticipated to lead to a new research area of asymmetric synthesis and catalysis and to have a broad impact on chemical, medicinal, and material sciences in future.

Development of a Safely Handleable Synthetic Equivalent of Cyanonitrile Oxide by 1,3-Dipolar Cycloaddition of Nitroacetonitrile

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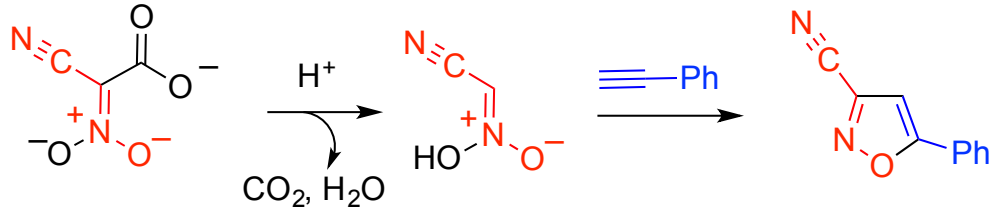
Chem. Commun. **2019**, *55*, 7903–7905. **DOI:** 10.1039/c9cc03875b

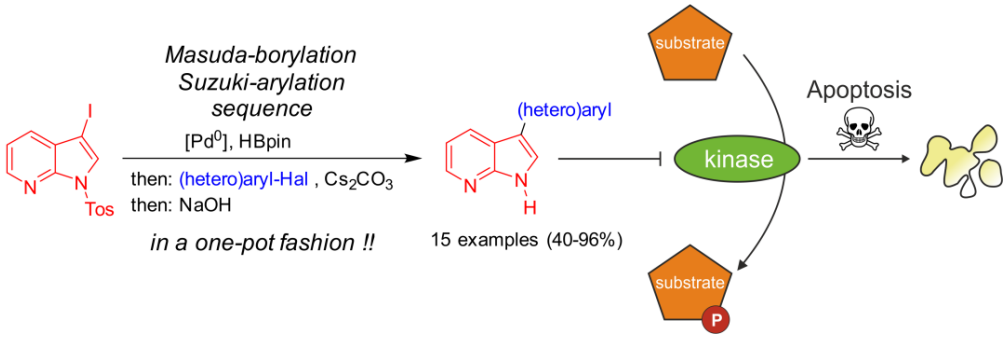


Abstract: Dianionic cyano-*aci*-nitroacetate affords 3-cyanoisoxazol(in)es upon heating with a range of dipolarophiles in the presence of hydrochloric acid. In this reaction, nitroacetonitrile is formed as an intermediate active species, which serves as a synthetic equivalent of cyanonitrile oxide that can participate in a 1,3-dipolar cycloaddition reaction.

Novel Meriolin Derivatives as Rapid Apoptosis Inducers

Daniel Drießen, Fabian Stuhldreier, Annika Frank, Holger Stark, Sebastian Wesselborg, Björn Stork, Thomas J. J. Müller* (thomasjj.mueller@hhu.de)

Bioorg. Med. Chem. **2019**, *27*, 3463–3468. **DOI:** 10.1016/j.bmc.2019.06.029



Abstract: 3-(Hetero)aryl substituted 7-azaindoles possessing multikinase inhibitor activity are readily accessed in a one-pot Masuda borylation-Suzuki coupling sequence. Several promising derivatives were identified as apoptosis inducers and, emphasizing the multikinase inhibition potential, as sphingosine kinase 2 inhibitors. Our measurements provide additional insights into the structure-activity relationship of meriolin derivatives, suggesting derivatives bearing a pyridine moiety with amino groups in 2-position as most active anticancer compounds and thus as highly promising candidates for future *in vivo* studies.