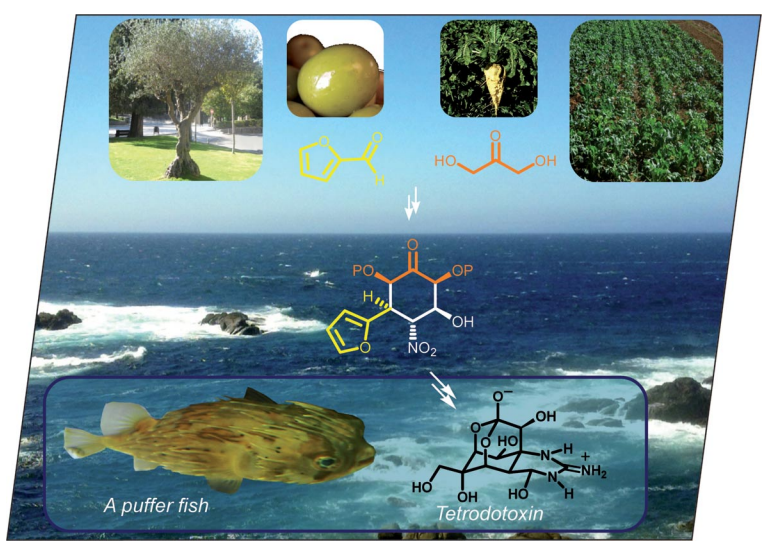
COVER PICTURE

The cover picture shows furfural and dihydroxyacetone, which are two compounds that can be obtained from plant sources, for example, from olive stones and sugar beets, respectively. These compounds can be used as building blocks for a convergent, cascade annulation based synthetic approach to the sodium channel blocker tetrodotoxin isolated from puffer fish. Details are discussed in the article by F. Cagide-Fagín and R. Alonso on p. 6741ff.

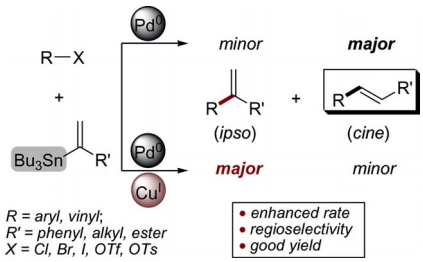


CONTENTS

MICROREVIEW

cine Substitution

Keywords: Natural products / Cross-coupling / *cine* Substitution / Copper / Stille reaction

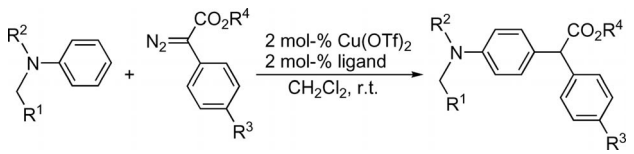


cine Substitution resulting from slow transmetallation is an "abnormal" phenomenon in classic Stille cross-couplings of sterically hindered vinyltins. Two mechanistic explanations are critically evaluated. As a method of countering *cine* substitution, co-catalysis by Cu^{I} can accelerate transmetallation remarkably and on occasion restore the *ipso* selectivity.

SHORT COMMUNICATIONS

Aromatic Substitution

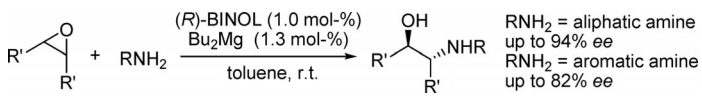
Keywords: Aromatic substitution / Substituent effects / Synthetic methods / Arenes / Diazo compounds



The intermolecular aromatic substitution of *N*,*N*-disubstituted anilines with diazo esters is shown to proceed under mild conditions in the presence of a catalytic amount of copper(II) triflate/ligand complex (up to 89% yield). The scope and limitations regarding substrates, diazoesters, and ligands in this reaction are described.

Enantioselective Catalysis of Epoxides

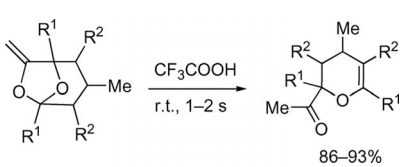
Keywords: Asymmetric catalysis / Epoxides / Amino alcohols / Amines / Magnesium



Cheap and easily available chiral BINOLate/Bu_2Mg complexes have been demonstrated to be efficient catalysts in the enantioselective ring opening aminolysis of *meso*-epoxides with both aromatic and aliphatic amines as nucleophiles. The corresponding β-amino alcohols were obtained in good yields with moderate to high *ee* values.

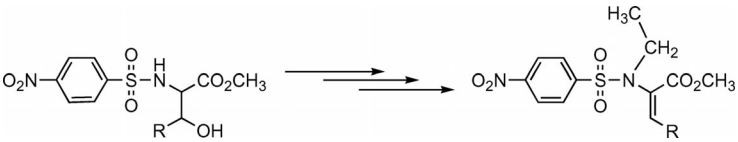
Synthetic Methods

Keywords: Heterocycles / Oxygen heterocycles / Synthetic methods / Dihydropyran synthesis



The products of the one-pot assembly of ketones and acetylene, 7-methylene-6,8-dioxabicyclo[3.2.1]octanes, congeners of an insect pheromone frontalin, undergo an acid-catalyzed rearrangement to diastereomerically pure 2-acetyl-3,4-dihydropyrans in excellent yields. The synthesis is realizable in a one-pot manner procedure directly from ketones and acetylene.

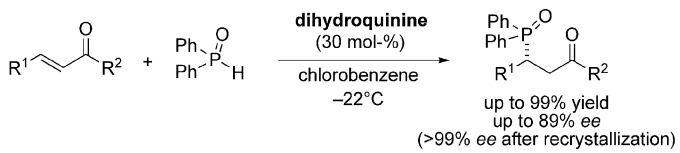
N-Ethyl-α,β-dehydroamino Acids



Keywords: Amino acids / Elimination / α,β-Dehydroamino acids / Alkylation / *N*-Ethyl-α,β-dehydroamino acids

Two routes for the synthesis of *N*-ethyl-*N*-(4-nitrophenylsulfonyl)-α,β-dehydroamino acid derivatives from serine, threonine and phenylserine derivatives are presented. In both a sequential alkylation/dehydration procedure is carried out, but in alternative sequence. This methodology allowed the synthesis for the first time of new non-natural amino acids, which incorporate both the *N*-ethyl and α,β-dehydro moieties.

Organocatalysis

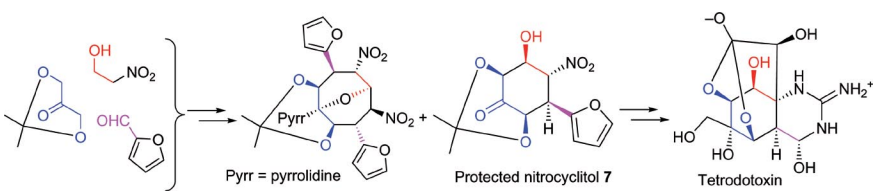


Keywords: Michael addition / Alkaloids / Organocatalysis / Phosphorus / Enones

The first enantioselective conjugate addition of commercially available diphenylphosphane oxide to *trans*-chalcones has been conveniently developed by using dihydroquinine as the catalyst. The adducts were isolated in high yield and up to 89% *ee*.

FULL PAPERS

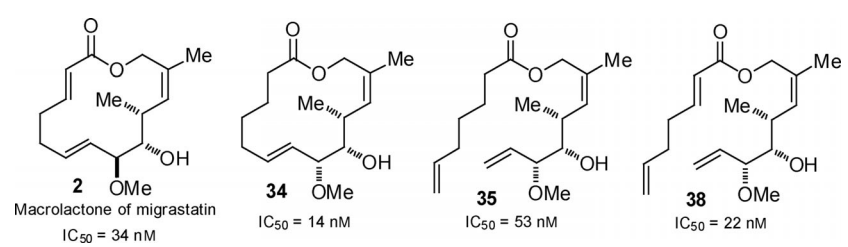
Convergent Approach to TTX



Keywords: Natural products / Annulation / Cyclitols / β-(Hetero)aryl-α-nitro-α,β-enals / 2,2-Dimethyl-1,3-dioxan-5-one

A batch preparation (11 g) of the protected nitrocyclitol **7** and its capability to sustain a convergent formal synthesis of (±)-tetrodotoxin in only 26 steps illustrate the practicability of the formal [3+3] annulation of β-heteroaryl-α-nitro-α,β-enals as well as its versatility for the synthesis of natural products containing highly oxygenated cyclohexanes.

Natural Product Synthesis

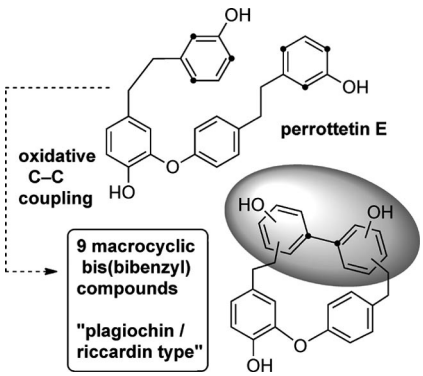


Keywords: Total synthesis / Natural products / Lactones / Antitumor agents / Inhibition

The synthesis of macrolactones **2** and **34** as well as esters **35** and **38** proceeds in good overall yields. Macrolactone **34** and ester **38** are amongst the most active compounds of the migrastatin family prepared so far and show good promise as anticancer compounds.

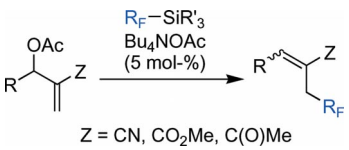
CONTENTS

Natural Product Synthesis



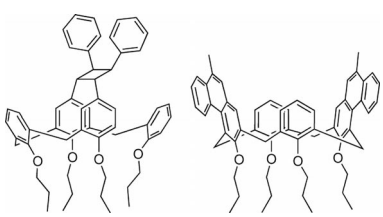
Nine isomeric macrocyclic bis(bibenzyl) compounds of the plagiochin/riccardin type, some of which have been found in liverworts, derive biochemically from perrottetin E. Growing interest due to recent reports on new isolated compounds and their remarkable biological activities prompted us to synthesize these bryophyte constituents. We report a flexible general approach to the total set of nine bis(bibenzyl) compounds.

Fluorinated Compounds



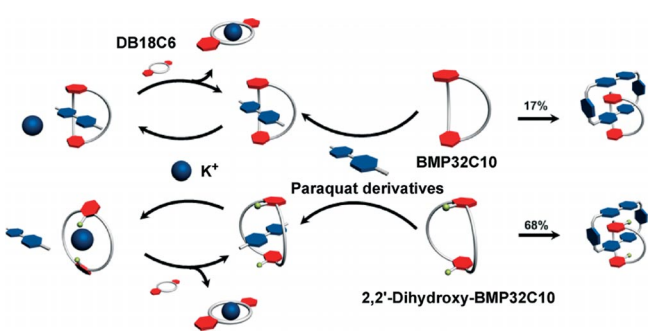
Reactions of Baylis–Hillman adducts with fluorinated silanes triggered by catalytic amounts of Bu_4NOAc are described.

Calixarenes



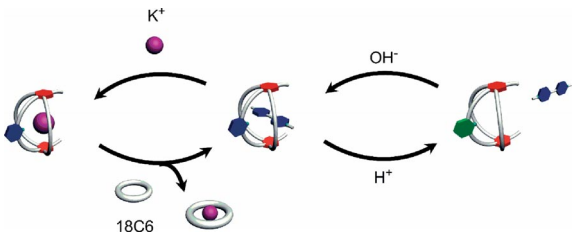
Oxidative cyclization to phenanthrenes and the transannular [2+2] cycloaddition reaction are observed as competing processes during the photolysis of distyryl- and tetrastyryl-substituted calix[4]arenes.

Host-Guest Chemistry



A bis(*m*-phenylene)-32-crown-10 derivative formed pseudorotaxanes and not the previously reported "taco complexes" with paraquat derivatives both in solution and in the solid state, as seen in the efficient formation of a [2]catenane and its crystal structure with a paraquat derivative. Another unique feature was that its binding to paraquat derivatives could be switched off and back on.

Host–Guest Chemistry



Keywords: Cryptands / Crown compounds / Host-guest systems / Taco complexes / Controllable assembly

A novel bis(1,2,3-phenylene) cryptand has been synthesized and used to prepare 1:1 complexes with paraquat and diquat, with association constants of 2.2×10^3 M^{-1} and 3.7×10^3 M^{-1} ($CHCl_3$/CH_3CN 1:1). In the solid state the cryptand forms a taco complex with paraquat, never found before in cryptand/paraquat complexes. Binding to paraquat and diquat can be controlled by addition or removal of K^+ or acid.

Carbocycles and Heterocycles

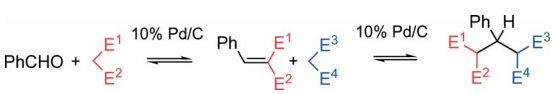
Keywords: Carbocycles / Heterocycles / Sulfones / Desulfonylation / Michael addition / Nucleophilic substitution

In a diversity-oriented and metal-free approach, acyclic vinyl sulfones with a leaving group at the δ position reacted with externally delivered C, N, and S nucleophiles to afford six-membered carbo- and heterocycles diastereoselectively. Isolation of intermediates showed these are examples of a Michael–S_N2 sequence and not an S_N2–Michael sequence, as is more prevalent in this class of reactions.

X = H or CH_2OBn
Y = CRR, NR', S
(12 examples)

Palladium-Catalyzed Michael Addition

Keywords: Michael addition / Palladium / C-H activation

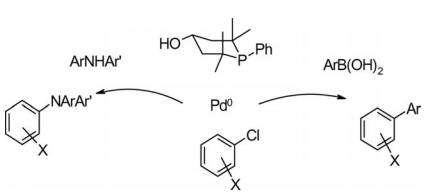


Palladium on carbon (10% Pd catalyzes the (retro-)Michael addition of activated methylene compounds **2a–d** to mono- and doubly activated styrenes. The scope and limitations of the reaction are described. A mechanism is proposed.

Unactivated Arylhalide Cross-Coupling

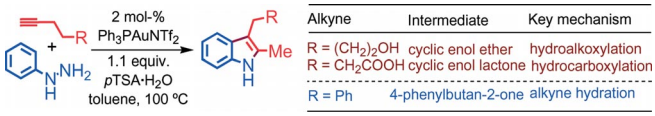
Keywords: Phosphane ligands / Palladium / Organopalladium chemistry / Amination

A two-step entry to a chemically robust, hindered P,O-type phosphorinane-based ligand and its application toward Pd-mediated cross-coupling reactions of unactivated aryl chlorides is presented.



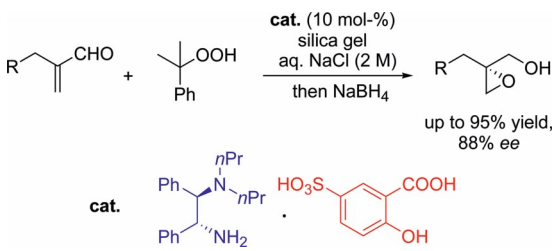
CONTENTS

Tandem Reactions



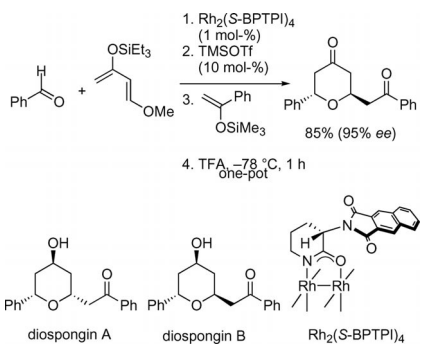
A method for the synthesis of 2,3-disubstituted indoles from alkynes and arylhydrazines is reported that utilizes a $Ph_3PAuNTf_2$/*p*TSA·H_2O binary catalytic system. Mechanistic aspects including an alkyne-dependant dichotomy is also discussed.

Asymmetric Catalysis



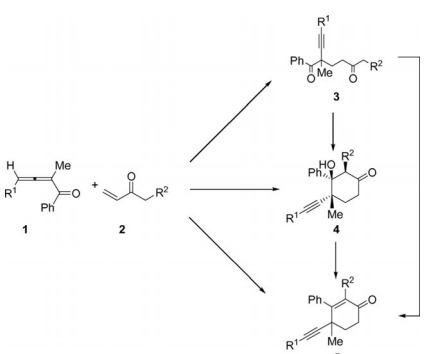
A primary-tertiary diamine Brønsted acid conjugate, combined with 5-sulfosalicyclic acid (5-SSA), was found to be an efficient catalyst for the asymmetric epoxidation of α-substituted acroleins.

Natural Products



A short, catalytic, asymmetric synthesis of diospongins A and B has been achieved by using a one-pot, sequential [Rh_2(*S*-BPTPI)$_4$]-catalyzed enantioselective hetero-Diels–Alder reaction combined with a TMSOTf-catalyzed Mukaiyama–Michael reaction.

Tandem Reaction



Further investigations on the chemistry of alkynylenolate were performed and a tandem Michael addition/aldol reaction of allenic ketones with vinyl ketones was developed. Various products were obtained from the same starting materials under different conditions and only one diastereoisomer of hydroxycyclohexanone was isolated.

* Author to whom correspondence should be addressed.

Supporting information on the WWW (see article for access details).

If not otherwise indicated in the article, papers in issue 34 were published online on November 22, 2010

