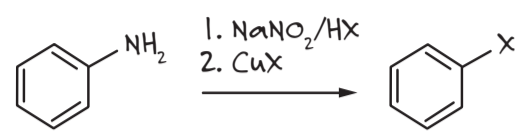


1884

Sandmeyer reaction
T. Sandmeyer

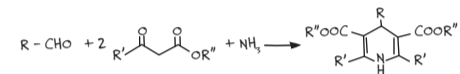
Free radical reactions Generates an aryl halide from the corresponding aryl diazonium salt using copper salts as catalysts or reagents.



1882

Hantzsch dihydropyridine synthesis
A. Hantzsch

Heterocycle formation Produces 1,4-dihydropyridines (DHPs), or "Hantzsch esters", as isolable intermediates that can then be oxidized to pyridines.



1886

Knorr pyrrole synthesis
L. Knorr

Heterocycle formation Used to create substituted pyrroles through reacting an α -amino-ketone and a compound containing an electron-withdrawing group e.g. an ester to a carbonyl group.

1887

Reformatsky reaction
S. Reformatsky

Reactions involving carbonyl compounds Condenses aldehydes or ketones with α -halo esters using metallic zinc to form β -hydroxy-esters.

1893

Pomeranz-Fritsch reaction
C. Pomeranz and P. Fritsch

Heterocycle formation Condensation of benzaldehydes or arylketones with aminoacetaldehyde acetals, it is used to synthesize isoquinolines.

1897

Gattermann and Gattermann-Koch formylation
L. Gattermann and J.A. Koch

Electrophilic aromatic substitution reactions Creation of a formyl (aldehyde) functionality by treating with a mixture of hydrogen cyanide (HCN) and hydrogen chloride (HCl) in the presence of a Lewis acid catalyst such as $AlCl_3$.

1900

Fries rearrangement
K. Fries and colleagues

Electrophilic aromatic substitution reactions Preparation of hydroxy aryl ketones through transformation of phenolic esters via Lewis acid catalysis.

1901

Ullmann reaction
F. Ullmann

Transition metal-catalyzed couplings Traditionally the Ullmann reaction refers to the synthesis of symmetric biaryls via copper-catalyzed coupling at high temperatures (200 °C).

1909

Prilezhaev reaction
N.A. Prilezhaev

Electrophilic addition reactions Reaction of an alkene with a peroxy acid (often meta-chloroperoxybenzoic acid (m-CPBA), due to its stability and good solubility in most organic solvents) to form epoxides.

1911

Pictet-Spengler tetrahydroisoquinoline synthesis
A. Pictet and T. Spengler

Heterocycle formation An important acid-catalyzed transformation for the synthesis of tetrahydroisoquinolines from carbonyl compounds and β -arylethylamines.

1915

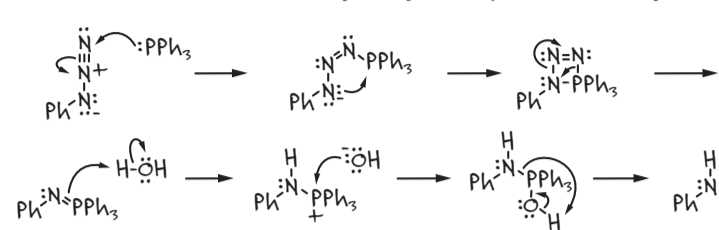
Houben-Hoesch synthesis
K.Hoesch and J. Houben

Electrophilic aromatic substitution reactions This reaction is a type of Friedel-Crafts acylation with hydrogen chloride and a Lewis acid catalyst to prepare an aryl ketone from reaction of a nitrile with an arene compound.

1919

Staudinger reaction
H. Staudinger and J. Meyer

Reduction reactions Creates primary amines via the reaction between an azide and phosphine, which form a reactive aza-ylide as an intermediate that is hydrolyzed spontaneously.



1926

Meerwein-Ponndorf-Verley reduction
H. Meerwein, W. Ponndorf and A. Verley

Reduction reactions Hydrogenation which does not require the use of hazardous pressurized H_2 , but utilizes available, inexpensive, and easy-to-handle hydrogen donor molecules to carry out the substrate hydrogenation.

1937

Oppenauer oxidation
R.V. Oppenauer

Oxidation Selective oxidation of secondary alcohols to ketones reaction takes place in the presence of $[Al(i-PrO)_3]$ in an excess of acetone.

1954

Paterno-Büchi reaction
E.P. di Sessa and G.H. Büchi

Pericyclic and photochemical reactions Formation of oxetanes through the photochemical [2+2] cycloaddition of a carbonyl with an alkene.

1946

Jones oxidation
E.R.H. Jones and colleagues

Oxidation Used to convert primary alcohols into carboxylic acids or secondary alcohols into ketones using chromic acid (Jones Reagent).

1939

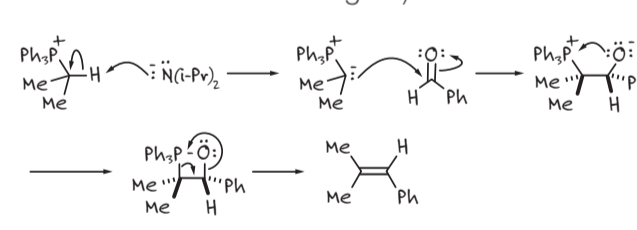
Meerwein arylation
H. Meerwein

Free radical reactions A powerful tool for the diverse functionalization of alkenes through addition of an aryl diazonium salt (ArN_2X) to an electron-poor alkene usually supported by a metal salt.

1950

Wittig reaction
G. Wittig and G. Geissler

Pericyclic and photochemical reactions Preparation of alkenes through reaction of an aldehyde or ketone with a triphenyl phosphonium ylide (often called a Wittig reagent).



1939

Hunsdiecker reaction
C. and H. Hunsdiecker

Free radical reactions Forms alkyl bromides via the decarboxylation of mercury or silver salts of carboxylic acids by treating with bromine. The alkyl bromide contains one fewer carbons than the carboxylic acid.

1937

Overman rearrangement
L. Overman

Pericyclic and photochemical reactions Generating allylic trichloroacetamides through an imidate intermediate from allylic alcohols it has found application in asymmetric synthesis.

1964

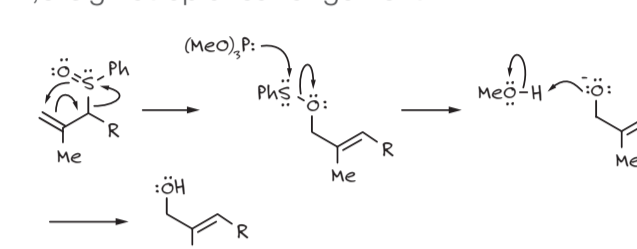
Eschenmoser - Claisen rearrangement
A. Eschenmoser

Pericyclic and photochemical reactions Produces a γ,δ -unsaturated amide when an allylic alcohol is heated with N,N-dimethylacetamide dimethyl acetal.

1968

Mislow-Evans rearrangement
K. Mislow and D. Evans

Pericyclic and photochemical reactions A general application for the preparation of trans-allylic alcohols from allylic sulfoxides in a 2,3-sigmatropic rearrangement.



1973

Keck radical allylation
M. Kosugi and J. Grignon

Free radical reactions Used for the conversion of aldehydes into homoallylic alcohols.



1967

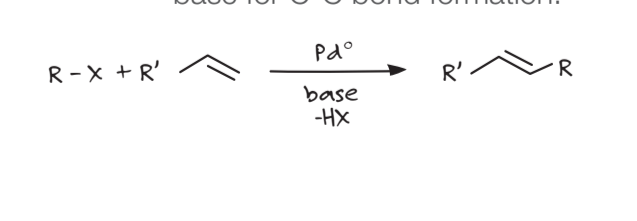
Mitsunobu reaction
O. Mitsunobu

Nucleophilic substitution reactions Converts an alcohol into a variety of functional groups, such as an ester, using triphenylphosphine and an azodicarboxylate such as diethyl azodicarboxylate (DEAD) or diisopropyl azodicarboxylate (DIAD).

1970

Heck reaction
T. Mizoroki and R.F. Heck

Transition metal-catalyzed couplings Used frequently in the synthesis of heterocyclic compounds the reaction of aryl halides or vinyl halides with activated alkenes in the presence of a Palladium-catalyst along with a base for C-C bond formation.



1974

Schwartz hydrozirconation
D.W. Hart and J. Schwartz

Electrophilic addition reactions Describes the use of the reagent Zirconocene hydrochloride otherwise known as zirconocene chloride hydride, a metallocene used for various transformations of alkenes and alkynes.

1978

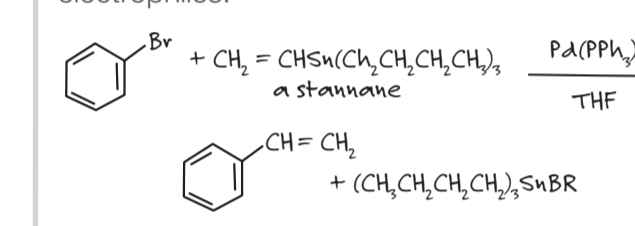
Swern oxidation
D. Swern and co-workers

Nucleophilic substitution reactions A mild oxidation that converts a primary or secondary alcohol to the corresponding aldehyde or ketone using oxalyl chloride, dimethyl sulfoxide (DMSO) and an organic base, such as triethylamine.

1978

Stille cross-coupling reaction
J.K. Stille

Transition metal-catalyzed couplings Palladium catalyzed carbon-carbon bond formation via the coupling of an organotin compound with a variety of organic electrophiles.



1979

Suzuki cross-coupling reaction
A. Suzuki

Transition metal-catalyzed couplings Palladium catalyzed carbon-carbon bond formation where the coupling partners are a boronic acid/ester or equivalent and an organohalide.

1980

Noyori asymmetric hydrogenation
R. Noyori

Electrophilic addition reactions The asymmetric hydrogenation of aldehydes, ketones and imines catalyzed by Ru(II)-BINAP and related ruthenium complexes.

1996

Shi asymmetric epoxidation
Y. Shi

Electrophilic addition reactions Synthesis of epoxides from various alkenes using a fructose-derived organocatalyst with Oxone as the primary oxidant.

Key named reactions in organic chemistry

1887

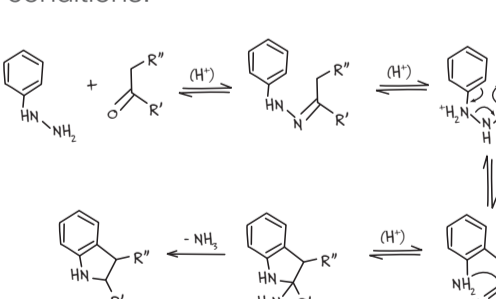
Gabriel synthesis
S. Gabriel

Nucleophilic substitution reactions Traditionally using potassium phthalimide transforms primary alkyl halides into primary amines.

1883

Fischer indole synthesis
E. Fischer and F. Jourdan

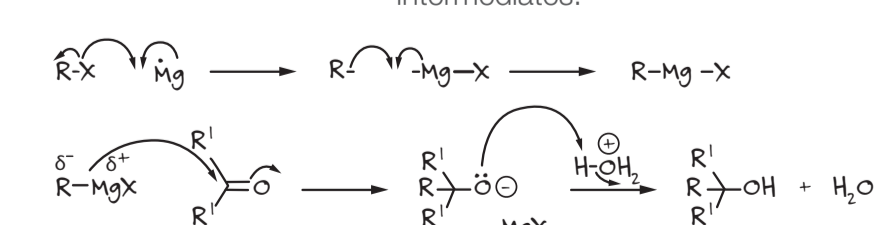
Heterocycle formation Generates aromatic heterocycle indole from a (substituted) phenylhydrazine and an aldehyde or ketone under acidic conditions.



1877

Friedel-Crafts acylation and alkylation reaction
C. Friedel and J.M. Crafts

Electrophilic aromatic substitution reactions Acylation or alkylation of an aromatic ring via reaction with an acyl or alkyl halide in the presence of a strong Lewis acid typically aluminium chloride.



1899

Baeyer-Villiger oxidation
A. Baeyer and V. Villiger

Nucleophilic substitution reactions Generation of an ester from a ketone or a lactone from a cyclic ketone using peroxyacids or peroxides.

1894

Knoevenagel condensation
E. Knoevenagel

Reactions involving carbonyl compounds Often used to generate α,β -unsaturated ketones through nucleophilic addition of an active hydrogen compound to a carbonyl group followed by a dehydration reaction in which a molecule of water is eliminated.

1906

Tishchenko reaction
V. E. Tishchenko

Nucleophilic substitution reactions Catalysed by aluminium alkoxides or sodium alkoxides generates the ester from the corresponding aldehyde.

1900

Grignard reaction
V. Grignard

Reactions involving carbonyl compounds Some important applications are the synthesis of alcohols, aldehydes or ketones, monocarboxylic acids, and other organometallic or organometalloid compounds via organo magnesium intermediates.

1913

Clemmensen reduction
E.C. Clemmensen

Reduction reactions Reduces aldehydes or ketones to alkanes in the presence of zinc amalgam and concentrated hydrochloric acid.

1911

Wolff-Kishner reduction
N. Kishner and L. Wolff

Reduction reactions Converts carbonyl functionalities into alkanes. It is often used to remove a carbonyl group after it has served its synthetic purpose of activating an intermediate in a preceding step.

1919

Wohl-Ziegler bromination
A. Wohl and K. Ziegler

Free radical reactions Generates allylic and benzylic bromides through allylic or benzylic bromination of hydrocarbons using the reagent N-bromosuccinimide combined with a radical initiator.

1917

Mannich reaction
C. Mannich

Reactions involving carbonyl compounds Formation of a β -amino-carbonyl compound, also known as a Mannich base, through amino alkylation of an acidic proton next to a carbonyl containing functional group by formaldehyde and a primary or secondary amine or ammonia.

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