**Synthesis Alerts** is a monthly feature to help readers of Synthesis keep abreast of new reagents, catalysts, ligands, chiral auxiliaries, and protecting groups which have appeared in the recent literature. Emphasis is placed on new developments but established reagents, catalysts etc are also covered if they are used in novel and useful reactions. In each abstract, a specific example of a transformation is given in a concise format designed to aid visual retrieval of information.

**Synthesis Alerts** is a personal selection by: Elyse Bourque, Jennifer Delaney, Andrew Gunn, Steven McAteer, Marcel de Puit, Sukhjinder Uppal, Tanya Wildmann and Josephine Yuen, Department of Chemistry, Leeds University, Leeds, LS2 9JT, UK.

The journals regularly covered by the abstractors are:
- Angewandte Chemie
- Chemical Communications
- Chemistry-A European Journal
- Collection of Czechoslovak Chemical Communications
- European Journal of Organic Chemistry
- Helvetica Chimica Acta
- Journal of Organic Chemistry
- Journal of the American Chemical Society
- Organic Letters
- Organometallics
- Perkin Transactions 1
- Synlett
- Synthesis
- Tetrahedron
- Tetrahedron Asymmetry
- Tetrahedron Letters

**Allylindium addition to α,β-unsaturated enones.**


Catalytic enantio- and position-selective dihydroxylation of polyisoprenoids.


Enantioselective ruthenium-catalysed ring closing metathesis.


**Dihydroxylation of (E)-nerolidol (yield 78%, %ee 94%) and squalene (yield 38%, %ee 90%), and the synthesis of A are also reported.**

**Enantioselective Dihydroxylation**

<table>
<thead>
<tr>
<th>n</th>
<th>R&lt;sup&gt;1&lt;/sup&gt;</th>
<th>R&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>H</td>
<td>H</td>
<td>62%</td>
</tr>
<tr>
<td>1</td>
<td>Me</td>
<td>H</td>
<td>62%</td>
</tr>
<tr>
<td>2</td>
<td>Me</td>
<td>Me</td>
<td>66%</td>
</tr>
</tbody>
</table>

12 examples (yields 61-74%). 4 examples of 1,4-addition to hex-4-en-3-one (yields 62-72%), the reaction of the allylindium reagent generated from ethyl-2-idoethanoate (4 examples; yields 62-74%), and the use of PPh<sub>3</sub> in place of SMe<sub>2</sub> (1 example; yield 15%) are also reported.

**Enantioselective ruthenium-catalysed ring closing metathesis.**


Ring Closing Metathesis

<table>
<thead>
<tr>
<th>Ar</th>
<th>R</th>
<th>Yield</th>
<th>er</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ph</td>
<td>Ph</td>
<td>78%</td>
<td>95:5</td>
</tr>
<tr>
<td></td>
<td>90%</td>
<td>68:32</td>
<td></td>
</tr>
</tbody>
</table>

3 examples (yields 78-96%, %ee 35-90%). Syntheses of the chiral catalysts are also reported.
Simple direct $\alpha$-allylation of aldehydes with allyl alcohols.

$$\text{Ph} \xrightarrow{\text{O} \text{H}} \text{CHO}$$

$\alpha$-Allylation
12 examples (yields 63-90%). The allylation works for a variety of 1° and 2° allylic alcohols. 5 Aldehydes and 6 different alcohols used.

Three-component catalytic asymmetric synthesis of aliphatic amines.

Asymmetric 1,2-Addition
11 examples (yields 48-98%, $\%\text{ee}$ 94-98%).

Olefin metathesis involving ruthenium enoic carbene complexes.

Metathesis
11 examples of cross metathesis (yield 41-99%) and 7 examples involving dimerisation of the substrate (yield 75-95%).

Highly regio- and stereoselective 1,1-cycloaddition of carbon monoxide with 1,4-dilithio-1,3-dienes.

Annulation; 1,1-Cycloaddition
13 examples (yield 58-91%). Benzyl bromide, allyl bromide and methyl iodide were also used as electrophiles.

Photohydrations and photoamidations of heterocycles leading to bicyclic oxazolines and functionalized cyclopentenes.

Ring Contraction
Palladium-catalyzed acylation of allylic esters with acylsilanes.

![Chemical structure](image)

Acylation

10 examples (yield 43-63%). Best results achieved with trifluoroacetate derivatives.

An efficient intermolecular palladium-catalyzed synthesis of aryl ethers.

![Chemical structure](image)

C–O sp²–sp³ Coupling

48 examples (yield 9-99%). The method works well for electron-deficient, neutral and electron-rich aryl halides with an α-alkyl substituent.

Enantioselective construction of a quaternary stereocentre via a Reissert-type reaction catalyzed by an electronically tuned bifunctional catalyst.

![Chemical structure](image)

Enantioselective Addition

11 examples (yields 59-98%, %ee 73-95%). MK801 was synthesized in six steps from the Reissert product.

Enantioselective direct addition of propargyl acetate to aldehydes.

![Chemical structure](image)

Enantioselective 1,2-Addition

Subsequent O-silyl protection, palladium-catalyzed isomerisation, AcOH addition and hydrolysis leads to optically active γ-hydroxy α,β-unsaturated aldehydes.

Mild and chemoselective oxidation of alcohols to carbonyl compounds.

![Chemical structure](image)

Oxidation

14 examples of oxidation of primary alcohols to aldehydes (yields 70-99%), 6 examples of oxidation of secondary alcohols to ketones (yields 75-98%) and 3 examples of chemoselective oxidation of diols to hydroxyaldehydes (yields 55-98%).
Esterification and amidation using dimethylsulfamoyl chloride and N,N-dimethylamines.

\[
\text{CO}_2\text{H} + \text{Me}_2\text{NSO}_2\text{Cl} (2 \text{ equiv.}) \rightarrow \text{Me}_2\text{N} \text{Me}_2 \text{SO}_2\text{Cl}
\]

\[
(1 \text{ equiv.}) \rightarrow \text{DMAP} (10 \text{ mol%}) \rightarrow \text{MeCN}, 40-45 \degree \text{C}, 1 \text{ h}
\]

15 examples of esterification (yields 71-94%) and 7 examples of amidation (yields 92-94%).

Diastereoselective synthesis of propargyl 1,2-anti-diol derivatives.

Stereoselective 1,2-Addition

<table>
<thead>
<tr>
<th>RCHO</th>
<th>yield</th>
<th>anti : syn</th>
</tr>
</thead>
<tbody>
<tr>
<td>isobutyraldehyde</td>
<td>96%</td>
<td>97:3</td>
</tr>
<tr>
<td>benzaldehyde</td>
<td>96%</td>
<td>97:3</td>
</tr>
<tr>
<td>crotonaldehyde</td>
<td>96%</td>
<td>96:4</td>
</tr>
<tr>
<td>hydrocinnamaldehyde</td>
<td>98%</td>
<td>97:3</td>
</tr>
<tr>
<td>pivaldehyde</td>
<td>96%</td>
<td>98:2</td>
</tr>
</tbody>
</table>

Reaction of the MOM-protected α-hydroxy propargylstannanes with the same aldehydes gave the corresponding products in 90-98% yield. The synthesis of a key intermediate towards the synthesis of formamicin is also reported.

\[
\text{NiCl}_2\text{(PCy}_3\text{)}_2 \text{-catalyzed cross-coupling of aryl tosylates and arylboronic acids.}
\]


Sp²–Sp² Coupling

11 examples (yields 47-99%).

Radical addition of Williams' glycinate auxiliaries to α-amidoacrylates.

Stereoselective Radical Addition

\[
\text{H}_2, \text{Pd/C} \rightarrow \text{THF-EtOH, ∆, 2 h}
\]

Chemoselective dibutyltin oxide-mediated transesterification.

Transesterification

16 examples (yields 77-96%). tert-Butyl alcohol cannot be used for transesterification.
Meerwein–Ponndorf–Verley reduction with new aluminium catalysts.

\[
\begin{align*}
\text{Meerwein–Ponndorf–Verley reduction with new aluminium catalysts.} \\
\end{align*}
\]

\[
\begin{align*}
\text{Reduction} \\
\text{A} (10 \text{ mol\%}) \text{i-PrOH (10 equiv.)} \\
\text{CH}_2\text{Cl}_2, \text{rt, 5 h} \quad 98\%
\end{align*}
\]

7 examples (yields 82-99%). All examples have been repeated with 5 g of starting ketones. Synthesis of A is also reported.

Palladium-catalyzed arylation of cyclic allylic benzoates.

\[
\begin{align*}
\text{sp}^3–\text{sp}^2 \text{ Coupling} \\
\text{Pd(dbca)}_2 (10 \text{ mol\%}) \\
\text{TBAF (2 equiv.)} \\
\text{THF, 50-60 °C, 12-48 h}
\end{align*}
\]

12 examples (yields 9-88%).

Imidyl and amidyl radical cyclisations: application to (-)-peduncularine.

\[
\begin{align*}
\text{N-Radical Cyclisations} \\
\text{DIEA (2.6 equiv.)} \\
\text{(PhSe)}_2 (2 \text{ equiv.}) \\
\text{(EtO)}_2 \text{PCl (1.6 equiv.)} \\
\text{–50 °C} \rightarrow \text{rt, 2 h} \quad 70\%
\end{align*}
\]

7 further amidyl examples (yields 59-84%) and 5 imidyl examples (yields 49-86%) are reported.

Chemoselective aerobic oxidation of primary alcohols catalysed by Ru complex.

\[
\begin{align*}
\text{Oxidation} \\
\text{A (2 mol\%)} \\
\text{hv, air, d}_6\text{-benzene} \\
\text{rt, 12 h} \quad \text{quantitative}
\end{align*}
\]

Functionalised primary alcohols (3 examples) were also oxidised in quantitative yield.

Intramolecular conjugate addition of alkenyl and aryl functions to enones initiated by Li-I exchange.

\[
\begin{align*}
\text{Conjugate Addition} \\
\text{A (2 mol\%)} \\
\text{hv, air, d}_6\text{-benzene} \\
\text{rt, 12 h} \quad \text{quantitative}
\end{align*}
\]

8 examples using alkenyl functions (yields 72-91%) and 3 examples using aryl functions (yields 75-90%).
Zirconium-catalyzed asymmetric carboalumination of alkenes towards the synthesis of chiral oligoisoprenoids.


Carboalumination

\[
\text{(a) MeAl (1 equiv.)} \\
\text{A (2 mol%) CH}_2\text{Cl}_2, \text{rt} \\
\text{(b) O}_2, \text{rt} \\
\text{4 steps} \\
\text{HO} \\
\text{79\%} \\
\text{er = 87:13} \\
\text{HO} \\
\text{21\% (over 5 steps)}
\]

ZrClCl

A

HO

Me 3 Al (1 equiv.)

A (2 mol%)

CH 2 Cl 2 , rt

O 2

7 examples (yields 65-86%, %ee 72-74%).

ZrClCl

A

HO

Phytophyl

21\% (over 5 steps)

4 steps

Stereoselective synthesis of functionalized trisubstituted olefins via palladium(0)-catalyzed cross-coupling.


sp 3–sp 2 Coupling

\[
\text{(a) Cp}_2\text{ZrCl} (2 \text{ equiv.)} \\
\text{THF, 55 °C, 1 h} \\
\text{(b) I}_2 (1.4 \text{ equiv.)} \\
\text{THF, rt, 15 min} \\
\text{(c) MeZnCl (5 equiv.)} \\
\text{Pd(PPh}_3\text{)}_4 (\text{cat.}) \\
\text{THF, rt, 1 h} \\
\text{(d) I}_2 (1 \text{ equiv.)} \\
\text{CH}_2\text{Cl}_2, \text{rt, 1 h} \\
\text{63\%}
\]

\text{PMP = p-methoxyphenyl}

2 examples of (+)-discodermolide models and 2 examples of callystatin A models.

Enantioselective ring cleavage of dioxane acetals: Application to desymmetrization of meso-1,3-diols.


Enantioselective Ring Cleavage

\[
\text{(a) HCl(OMe)}_2 (1.5 \text{ equiv.)} \\
\text{TSOH} \\
\text{C}_6\text{H}_12, 10 °C, 1 h} \\
\text{(b) p-MeOC}_6\text{H}_4\text{MeBr (1.5 equiv.)} \\
\text{Et}_2\text{O, rt, 24 h}
\]

\text{PMP = p-methoxyphenyl}

4 examples (yields 26-38\%, %ee 86-94%).

Nickel-promoted alkylative or arylative carboxylation of alkynes.


sp 3–sp 2 Coupling: Carboxylation

\[
\text{(a) CO}_2 (1 \text{ atm}) \\
\text{Ni(cod)}_2 (1 \text{ equiv.)} \\
\text{DBU (2 equiv.)} \\
\text{THF, 0 °C, 1 h} \\
\text{(b) CO}_2 (1 \text{ atm}) \\
\text{Ni(cod)}_2 (1 \text{ equiv.)} \\
\text{DBU (2 equiv.)} \\
\text{THF, 0 °C, 1 h} \\
\text{(3 equiv.)} \\
\text{THF, 0 °C, 2 h} \\
\text{82\%}
\]

11 examples (yields 33-100%) using both aliphatic and aromatic terminal alkynes in combination with a variety of organozincs, including functionalised aryl- and alkylzinc reagents. β-Hydride elimination only occurred when Et 2 Zn was employed.

New ammonia equivalents for the Pd-catalysed amination of aryl halides.


Amination

\[
\text{X} \text{ R} \text{ T} \text{ Yield} \\
\text{Cl} \text{ OMe} 80 °C 95\% \\
\text{Cl} \text{ Me} 80 °C 94\% \\
\text{Br} \text{ tPr} 100 °C 86\% \\
\text{Br} \text{ Ph} 100 °C 91\%
\]

8 Examples of di- and triarylamine preparation (yields 64-95%). The amination of m- and p-substituted aryl halides using LiHMDS (5 examples; yields 94-96%) and o-substituted aryl halides using aminophenylsilane (5 examples; yields 85-98%) are also reported.