

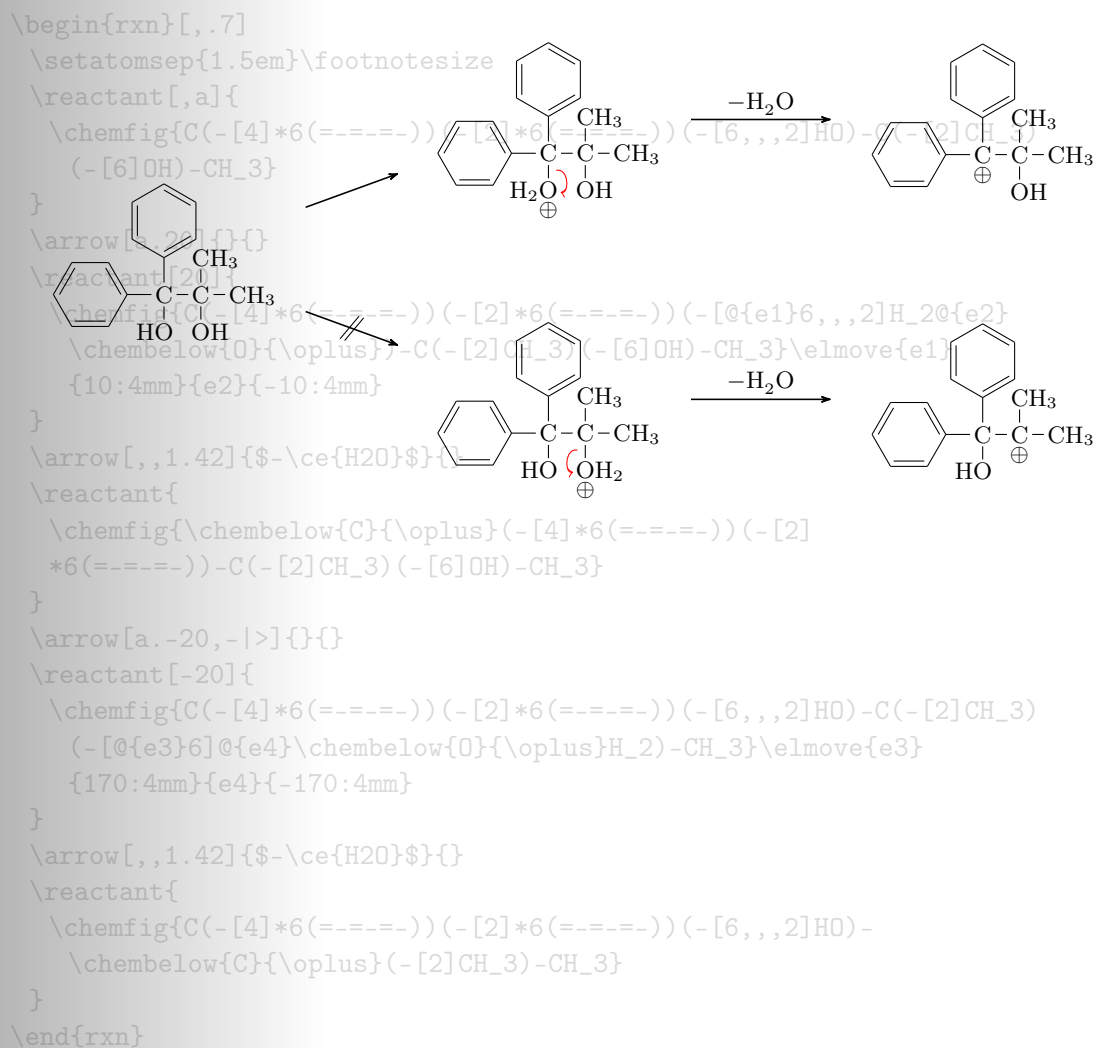
myChemistry

v1.5

April 23rd 2011

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# Examples



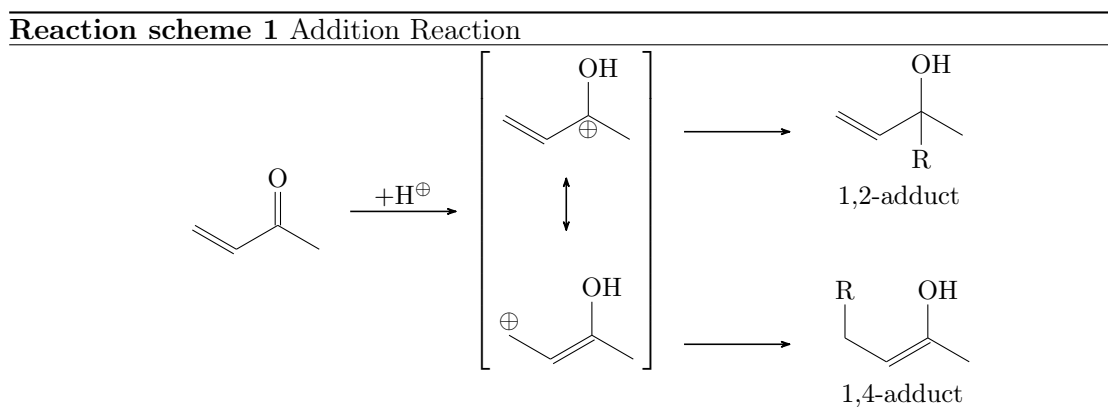
Since the documentation is already long enough, I decided to provide an extra file containing only examples and a few words where to find possibly interesting code.

## Example Schemes

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## 1 Addition Reaction

A simple reaction scheme with two different products.



```

1  \begin{rxnscheme}[,H]{Addition Reaction}
2  \reactant{ \chemfig{=[:-30]-[:60](=[:60]O)-[:-60]}
3  }
4  \arrow{ $+ \Hpl$ }{}
5  \mesomeric[,rf]{
6  \reactant{ \chemfig{=[:-30]-[:60](-[:60]OH)
7  (-[:-120,.3,,,white]\oplus)-[:-60]} }
8  \marrow[below]
9  \reactant[below]{ \chemfig{\oplus-[6,.3,,,white
10 ]-[:-30]=[:-60](-[:60]OH)-[:-60]} }
11 }

```

```

9   \branch[right=of rf,,yshift=3em]{
10   \arrow{}{}
11   \reactant{ \chemname{\chemfig{=_{[: -30] -[: :60] (-[: :60]
12   }
13   \branch[right=of rf,,yshift=-5em]{
14   \arrow{}{}
15   \reactant{ \chemname{\chemfig{R
16   -[6] -[: -30] =_{[: :60] (-[: :60] OH) -[: : -60]}}{1,4-adduct
17   } }
16   }
17   \end{rxnscheme}

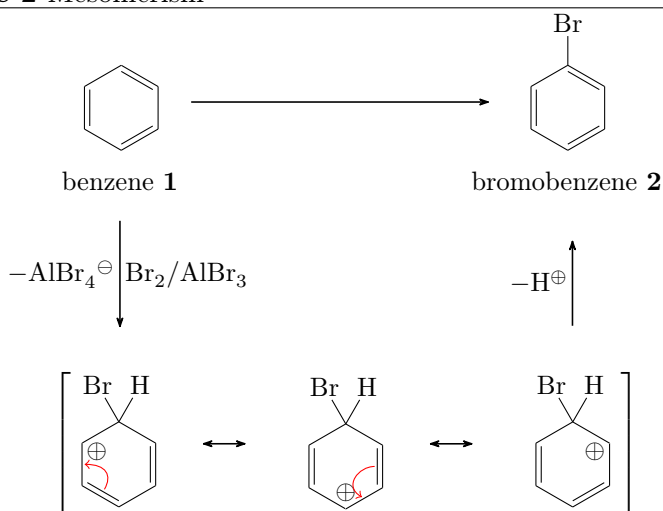
```

## 2 Mesomerism

---

Reaction scheme 2 Mesomerism

---



If you put something relative to an arrow you might have to consider, that the arrow's anchor point is in the middle of the arrow. That's why `\mesomeric` is shifted with `yshift=-2.5em` in line 9.

```

1   \begin{rxnscheme}[ ,H, ,.8]{Mesomerism}
2   \setatomsep{1.6em}
3   % main reaction:
4   \reactant[ ,start]{ \chemname{\chemfig{*6(==(-[ , , ,
5   white]\phantom{Br})-=)}}{benzene \compound{benzene}}
6   }
7   \arrow[ , ,2.8]{}{}

```

```

6   \reactant{ \chemname{\chemfig{*6(==(-Br)-)}}{
      bromobenzene \compound{bromobenzene}} }
7   % branch:
8   \arrow[start.below,,,pfeil_a]{\ce{Br2 / AlBr3}}{\$-\ce{
      AlBr4\om}}\$}
9   \mesomeric[pfeil_a.below,mesomerism,xshift=8.5em,yshift
      =-2.5em]{
10    \reactant{
11      \chemfig{*6(=[@{e1}]--(-[:120]Br)(-[:60]H)
      -(-[:30,.4,,,white]\oplus)-[@{e2}]})}
12      \elmove{e1}{60:4mm}{e2}{0:4mm}
13    }
14    \marrow
15    \reactant{
16      \chemfig{*6(-(-[:90,.4,,,white]\oplus)-[@{e4}]=[@{e
      3}]--(-[:120]Br)(-[:60]H)-=)}
17      \elmove{e3}{180:4mm}{e4}{150:4mm}
18    }
19    \marrow
20    \reactant{
21      \chemfig{*6(==(-[:150,.4,,,white]\oplus)-(-[:120]
      Br)(-[:60]H)-=)}
22    }
23  }
24  % last arrow inside a branch, since it cannot be shifted
      by itself:
25  \branch[above=of mesomerism,,,xshift=7.5em]{
26    \arrow[above]{\$-\Hpl\$}{\$}
27  }
28  \end{rxnscheme}

```

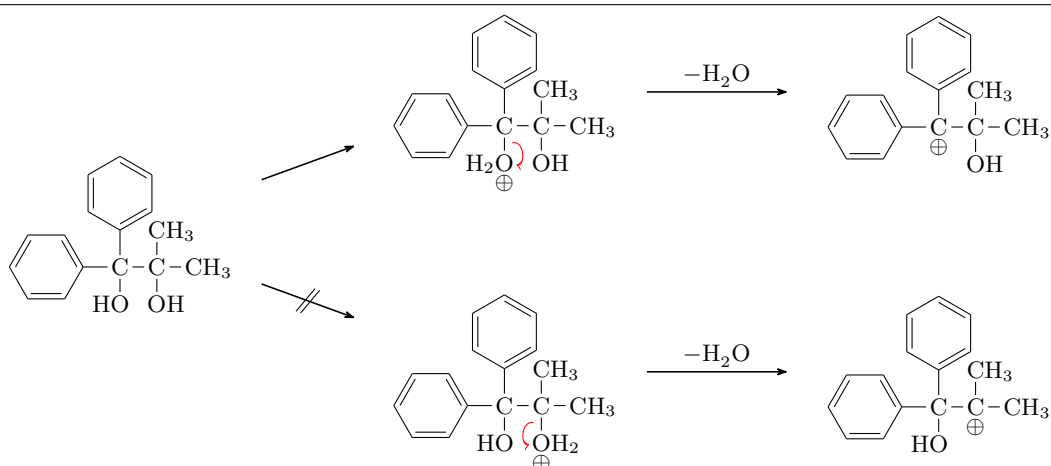
### 3 The Titlepage

```

1   \begin{rxn}[,.7]
2   \setatomsep{1.5em}\footnotesize
3   % reaction above:
4   \reactant[,a]{ \chemfig{C(-[4]*6(==--))(-[2]*6(==--))
      }(-[6,,,2]H0)-C(-[2]CH_3)(-[6]OH)-CH_3} }
5   \arrow[a.45]{}{}
6   \reactant[45]{ \chemfig{C(-[4]*6(==--))(-[2]*6(==--))
      }(-[@{e1}6,,,2]H_2@{e2}\chembelow{0}{\oplus})-C(-[2]
      CH_3)(-[6]OH)-CH_3\elmove{e1}{10:4mm}{e2}{-10:4mm} }
7   \arrow[, ,1.42]{\$-\ce{H2O}}\$}{}

```

## Reaction scheme 3 The Titlepage



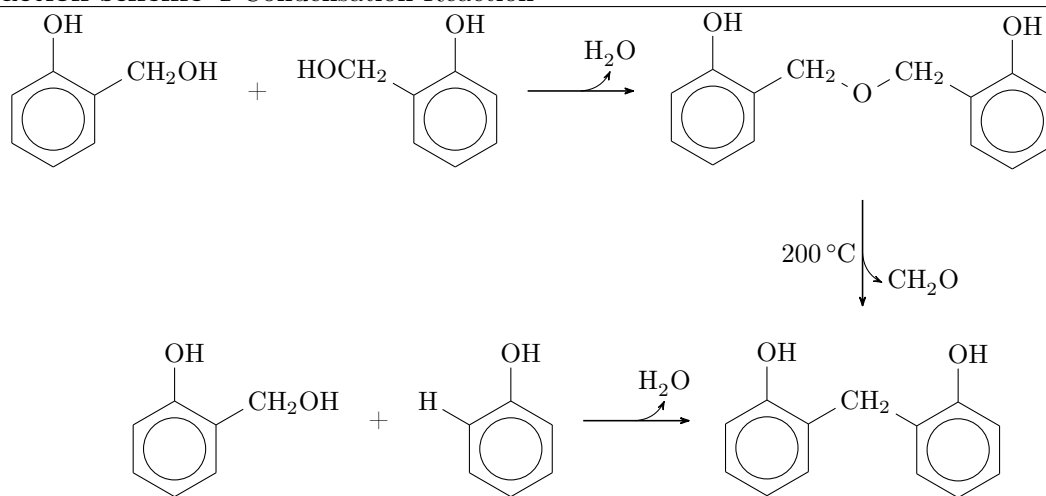
```

8   \reactant{ \chemfig{\chembelow{C}{\oplus}(-[4]*6(==--))
9       )(-[2]*6(==--)))-C(-[2]CH_3)(-[6]OH)-CH_3} }{}
10  % going down:
11  \arrow[a.-45,-|>]{}{}
12  \reactant[-45]{ \chemfig{C(-[4]*6(==--))
13      (-[2]*6(==--))(-[6,,,2]HO)-C(-[2]CH_3)(-[@{e3}6]@{e
14      4}\chembelow{0}{\oplus}H_2)-CH_3}\elmove{e3}{170:4mm
15      }{e4}{-170:4mm} }
16  \arrow[, ,1.42]{$-\ce{H2O}$}{}
17  \reactant{ \chemfig{C(-[4]*6(==--))(-[2]*6(==--))
18      (-[6,,,2]HO)-\chembelow{C}{\oplus}(-[2]CH_3)-CH_3} }
19  \end{rxn}

```

## 4 Condensation Reaction

Reaction scheme 4 Condensation Reaction



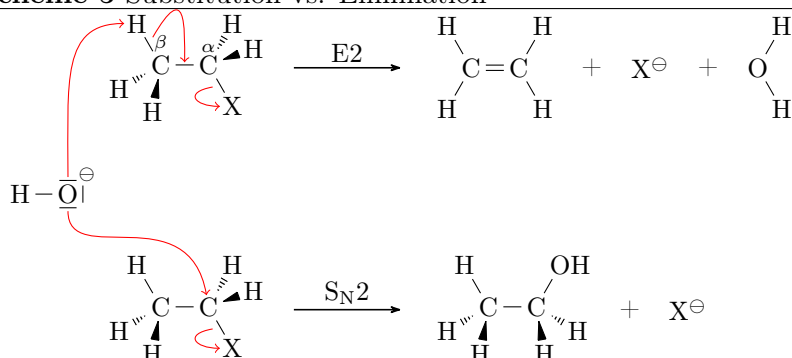
```

1 \begin{rxnscheme}[ ,H]{Condensation Reaction}
2 \reactant{\chemfig{**6(---(-CH_2OH)-(-OH)-)}}
3 \chemand
4 \reactant{\chemfig{**6(----(-OH)-(-HOCH_2)-)}}
5 \arrow[, -+>]{\ce{H2O}}
6 \reactant{\chemfig{**6(---(-CH_2-[: -30]O-[:30]CH
   _2-[: -30]**6(----(-OH)-))-(OH)-)}}
7 \arrow[-90, -+>, ,dec]{\ce{CH2O}}
8 \anywhere{dec.180, ,xshift=-.2em}{\SI{200}{\celsius}}
9 \reactant[-90, target]{\chemfig{**6(---(-CH
   _2-[: -30]**6(----(-OH)-))-(OH)-)}}
10 \branch[left=of target]{
11 \reactant{\chemfig{**6(---(-CH_2OH)-(-OH)-)}}
12 \chemand
13 \reactant{\chemfig{**6(----(-OH)-(-H)-)}}
14 \arrow[, -+>]{\ce{H2O}}
15 }
16 \end{rxnscheme}

```

## 5 Substitution vs. Elimination

Reaction scheme 5 Substitution vs. Elimination



You may see in line 20 that the `\elmove` commands are put inside of `\anywhere`. This is necessary in order to produce the right scheme. But this time you can position `\anywhere` literally anywhere.

```

1 \newcommand*\scrom{\scriptstyle\ominus}
2 \begin{rxnscheme}[ ,H]{Substitution vs. Elimination}
3 % first reaction:
4 \reactant[ ,start_a]{\chemfig{@{H}H-[@{b1}:-60]\chemabove
   {C}{\scriptstyle\beta}(<[: -100]H)(<[: -150]H)-[@{b
   2}]\chemabove{C}{\scriptstyle\alpha}(<[:20]H)(<[:60]
   H)-[@{b3}:-60]@{X1}X}}
5 \arrow{E2}{}
6 \reactant{\chemfig{H-[:60]C(-[:120]H)=C(-[:60]H)-[: -60]H
   }}
7 \chemand
8 \reactant{\ce{X\om}}
9 \chemand
10 \reactant{\chemfig{O(-[:60]H)-[: -60]H}}
11 % second reaction:
12 \reactant[start_a.-90,start_b,yshift=-4em]{\chemfig{H
   -[: -60]C(<[: -100]H)(<[: -150]H)-@{C}C(<[:20]H)
   (<[:60]H)-[@{b4}:-60]@{X2}X}}
13 \arrow{S$_\text{N}$2}{}
14 \reactant{\chemfig{H-[: -60]C(<[: -100]H)(<[: -150]H)-C
   (<[: -80]H)(<[: -30]H)-[:60]OH}}
15 \chemand
16 \reactant{\ce{X\om}}
17 % nucleophile/base:
18 \anywhere{start_b.135,nuc ,xshift=-3em,yshift=2em}{\
   chemfig{H-@{0}\chemabove{\lewis{026,0}}{\hspace{5mm}\

```

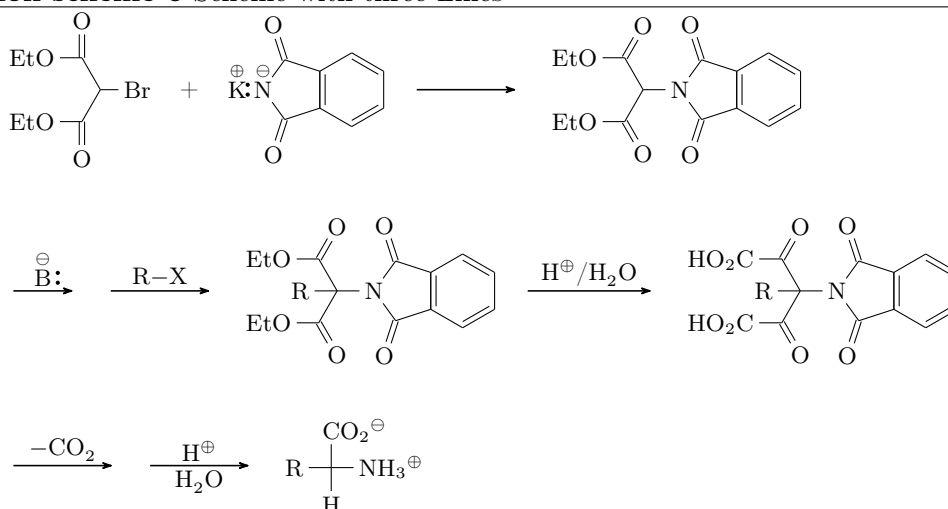
```

    scrom}}}}
19  % electron movements:
20  \anywhere{nuc.0}{
21    \elmove{0}{90:1.5cm}{H}{180:1cm}
22    \elmove{b1}{60:1cm}{b2}{90:5mm}
23    \elmove{b3}{-170:5mm}{X1}{180:5mm}
24    \elmove{0}{-90:1cm}{C}{100:1.5cm}
25    \elmove{b4}{-170:5mm}{X2}{180:5mm}
26  }
27  \end{rxnscheme}

```

## 6 Scheme with three Lines

Reaction scheme 6 Scheme with three Lines



```

1  \newcommand*\scrom{\scriptstyle\ominus}
2  \newcommand*\scrop{\scriptstyle\oplus}
3  \begin{rxnscheme}{Scheme with three Lines}
4    \setatomsep{1.5em}
5    \footnotesize
6    \reactant[,start]{\chemfig{EtO-(=[2]O)-[: -60](-Br)
   -[: -120]([6]O)-[4]EtO)}}
7    \chemand
8    \reactant{\chemfig{*6(---*5(-(=O)-\chemabove{\lewis
   {4:,N}}{\scrom}(-[4,.7,,,draw=none]\chemabove{K}{\scrop})-(=O)--)=)}}}
9    \arrow{}}{}

```

```

10 \reactant{\chemfig{*6(---*5(=(O)-N
    (-(-[: -60](=[: -60]O)-[:60]EtO)-[:60](=[:60]O)
    -[: -60]EtO)-(=O)--=)}}}
11 % newline, started with \anywhere:
12 \anywhere{start.-90,a,xshift=-4em,yshift=-5em}{}}
13 \arrow[a.0,,.6]{\chemabove{\lewis{0:,B}}{\scrom}}{}
14 \arrow{\ce{R-X}}{}
15 \reactant{\chemfig{*6(---*5(=(O)-N(-(-[4]R)
    (-[: -60](=[: -60]O)-[:60]EtO)-[:60](=[:60]O)
    -[: -60]EtO)-(=O)--=)}}}
16 \arrow[, ,1.25]{\Hpl/\ce{H2O}}{}
17 \reactant{\chemfig{*6(---*5(=(O)-N(-(-[4]R)
    (-[: -60](=[: -60]O)-[:60]HO_2C)-[:60](=[:60]O)
    -[: -60]HO_2C)-(=O)--=)}}}
18 % newline, started with \anywhere:
19 \anywhere{a.-90,b,yshift=-7em}{}}
20 \arrow[b.0]{\ce{- CO2}}{}
21 \arrow{\Hpl}{\ce{H2O}}
22 \reactant{\chemfig{R-(-[6]H)(-[2]C|O_2\om)-NH_3\op}}
23 \end{rxnscheme}

```

## 7 Hydratisation

A scheme with transition states.

For this example we first declare a style for the delocalized double bonds:

```

1 \pgfdeclaredecoration{ddbond}{initial}{%
2 \state{initial}[width=2pt]{%
3 \pgfpathlineto{\pgfpoint{2pt}{0pt}}%
4 \pgfpathmoveto{\pgfpoint{1.5pt}{2pt}}%
5 \pgfpathlineto{\pgfpoint{2pt}{2pt}}%
6 \pgfpathmoveto{\pgfpoint{2pt}{0pt}}%
7 }%
8 \state{final}{%
9 \pgfpathlineto{\pgfpointdecoratedpathlast}%
10 }%
11 }%
12 \tikzset{lddbond/.style={decorate,decoration=ddbond}}%
13 \tikzset{rddbond/.style={decorate,decoration={ddbond,
    mirror}}}%

```

Now the delocalized double bond can be used via **ChemFig**'s fifth option (see the **ChemFig** manual):

```

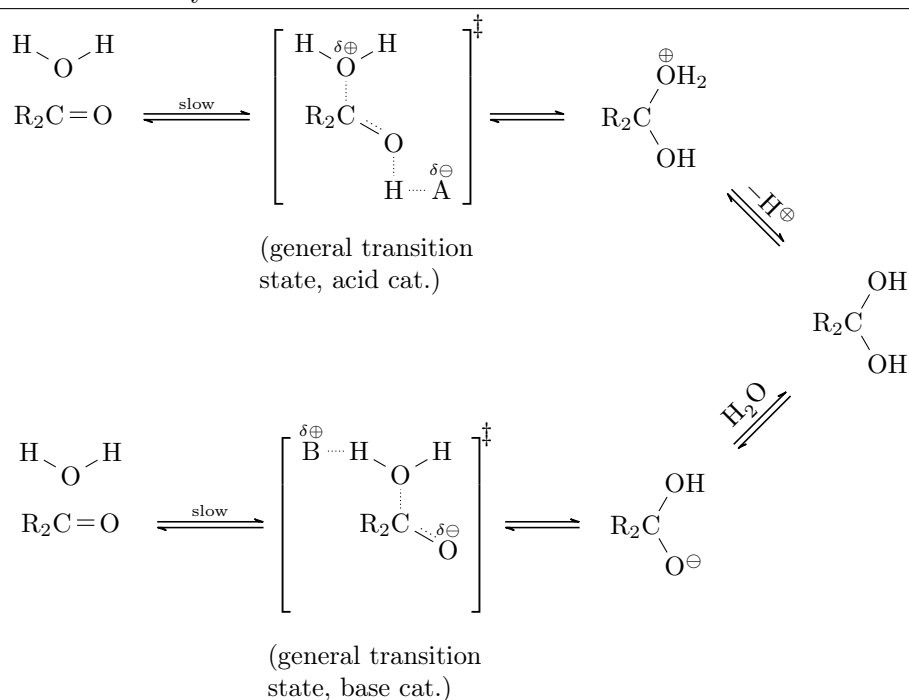
1 \chemfig{-[, , , lddbond]-[, , , rddbond]}

```

---

**Reaction scheme 7** Hydratisation
 

---



Further we define the two commands

```

1 \newcommand*\delm{\ensuremath{\text{\tiny$\delta\ominus$}}}
2 \newcommand*\delp{\ensuremath{\text{\tiny$\delta\oplus$}}}

```

to use the partial charges without effort.

Then the whole code looks like follows:

```

1 \begin{rxnscheme}{Hydratisation}
2 \reactant[, carbonyl_A]{\chemfig{R_2C=O}}
3 \anywhere{above=of carbonyl_A}{\chemfig{H-[: -30]O-[:30]H}}
4 \arrow[,<=>]{\tiny slow}{}
5 \transition[, transition_A]{\chemfig{R_2C(-[2,,2,,densely
   dotted]\chemabove{O}{\delp}(-[:150]H)-[:30]H)
   -[: -30,1.15,,,lddbond]O-[6,,,,densely dotted]H-[,,,
   densely dotted]\chemabove{A}{\delm}}}}
6 \anywhere{below=of transition_A,,text width=3cm}{(
   general transition state, acid cat.)}
7 \arrow[,<=>,.7]{}{}

```

```

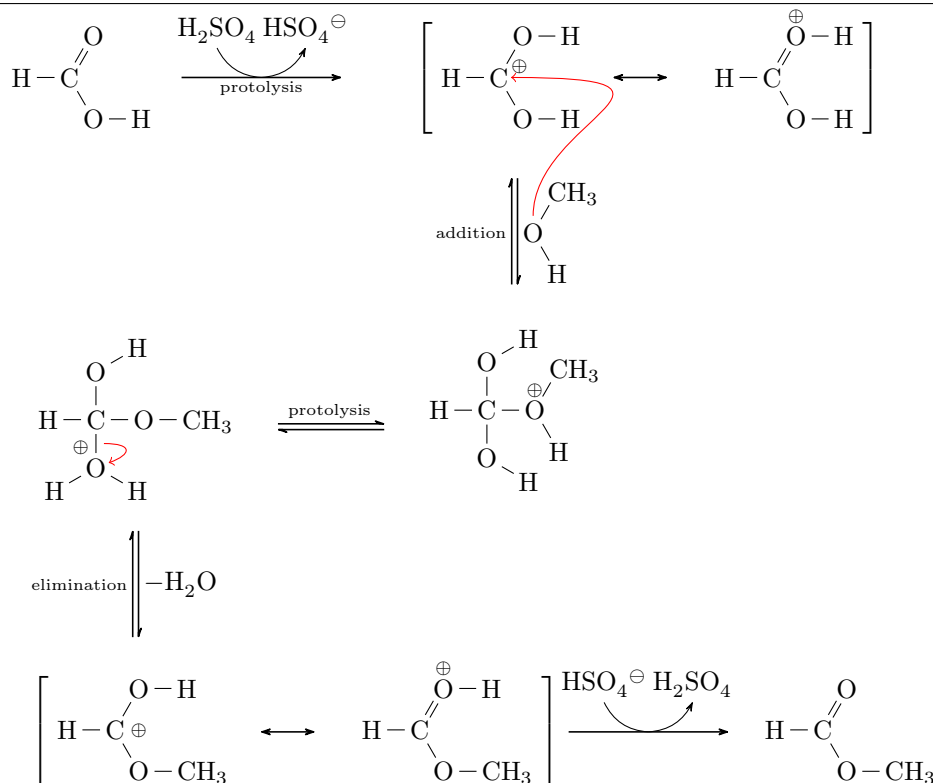
8   \reactant{\chemfig{R_2C(-[:60]\chemabove{O}{\scriptstyle
   \oplus}H_2) -[: -60]OH}}
9   \arrow[below right,<=>,.7]{\Hpl$}{}
10  \reactant[below right]{\chemfig{R_2C(-[:60]OH) -[: -60]OH
   }}
11  \arrow[below left,<=>,.7]{}{\ce{H2O}}
12  \reactant[below left,zw]{\chemfig{R_2C(-[:60]OH) -[: -60]O
   |\om}}
13  \arrow[left,<=>,.7]{}{}
14  \transition[left,transition_B]{\chemfig{R_2C(-[2,,2,,
   densely dotted]O(-[:150]H-[4,,,densely dotted]\
   chemabove{B}{\del p}) -[:30]H) -[: -30,1.15,,,lddbond]\
   chemabove{O}{\del m} -[6,,,draw=none]\phantom{H}}}}
15  \anywhere{below=of transition_B,,text width=3cm}{(
   general transition state, base cat.)}
16  \arrow[left,<=>]{\tiny langsam}{}
17  \reactant[left,carbonyl_B]{\chemfig{R_2C=O}}
18  \anywhere{above=of carbonyl_B}{\chemfig{H-[: -30]O -[:30]H
   }}
19  \end{rxnscheme}

```

You can see that `\anywhere` was used several times, either to place molecules or to label molecules.

## 8 Esterification

Reaction scheme 8 Esterification



```

1  \begin{rxn}{Esterification}
2    \reactant{\chemfig{H-C(=[:60]O)-[: -60]O-H}}
3    \arrow[, ->, 1.2, protolysis]{\ce{H2SO4}}{\ce{HSO4\om}}
4    \anywhere{below=of protolysis,, yshift=1em}{\tiny
      protolysis}
5    \mesomeric{
6      \reactant{\chemfig{H-@{a2}C(-[:60]O-H)(-[:30,.5,,,draw
          =none]{\scriptstyle\oplus})-[: -60]O-H}}
7      \marrow
8      \reactant{\chemfig{H-C(=[:60]\chemabove{O}{\scriptstyle\oplus}-H)-[: -60]O-H}}
9    }
10   \branch[below,, xshift=-5em]{
11     \arrow[below, <=>]{\tiny addition}{\chemfig{H-[:120]@{a
        1}O-[:60]CH_3}}
12     \reactant[below]{
13       \chemfig{H-C(-[:2]O-[:30]H)(-\chemabove{O}{\scriptstyle\oplus})-[: -60]O-H}}

```

```

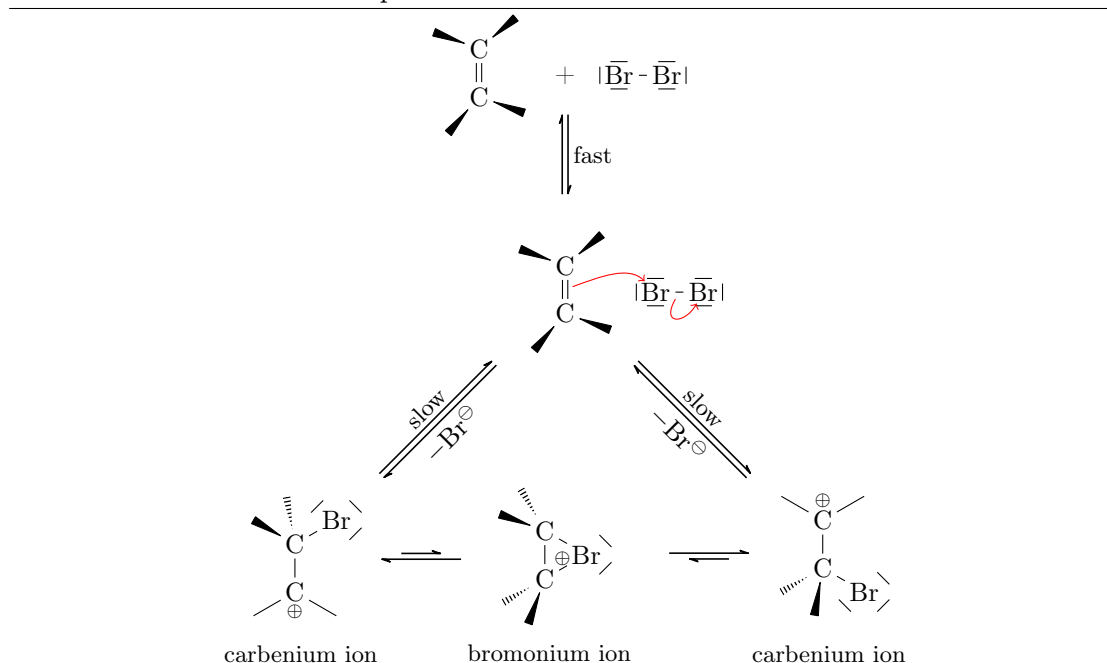
      \scriptstyle\oplus\}(-[:60]CH_3)-[: -60]H)-[6]O
      -[: -30]H}
14      \elmove{a1}{90:1.5cm}{a2}{0:3cm}
15    }
16  }
17  \branch[left,,yshift=-3.5em]{
18    \arrow[left,<=>]{}{\tiny protolysis}
19  }
20  \reactant[left]{
21    \chemfig{H-C(-[:2]O-[:30]H)(-O-CH_3)-[@{b1}6]@{a3}\
      chemabove{0}{\hspace*{-4mm}\scriptstyle\oplus
      }(-[: -150]H)-[: -30]H}
22    \elmove{b1}{0:5mm}{a3}{20:5mm}
23  }
24  \arrow[below,<=>]{\ce{- H2O}}{\tiny elimination}
25  \mesomeric[below,,xshift=6em]{
26    \reactant{\chemfig{H-C(-[:60]O-H)(-[:.5,,,draw=none]{\
      scriptstyle\oplus})-[: -60]O-CH_3}}
27    \marrow
28    \reactant{\chemfig{H-C(=[:60]\chemabove{0}{\
      scriptstyle\oplus}-H)-[: -60]O-CH_3}}
29  }
30  \arrow[, -+>,1.2]{\ce{HSO4\om}}{\ce{H2SO4}}
31  \reactant{\chemfig{H-C(=[:60]O)-[: -60]O-CH_3}}
32  \end{rxnscheme}

```

## 9 Electrophilic Addition

This scheme forms a circle.

Reaction scheme 9 Electrophilic Addition



```

1 \begin{rxnscheme}[,H]{Electrophilic Addition}
2 \setarrowlength{3em}
3 \reactant{\chemfig{>[: -20]C(<[: 40])=[6]C(<[: -130])
4 <[: -20]}}
5 \chemand[,plus]
6 \reactant{\chemfig{\lewis{246,Br}-\lewis{026,Br}}}
7 \arrow[plus.-90,<=>]{\footnotesize fast}{}
8 \reactant[-90,attack]{\chemfig{>[: -20]C(<[: 40])=[@{db}6]
9 C(<[: -130])<[: -20]}}
10 \anywhere{right=of attack}{
11 \chemfig{@{Br1}\lewis{246,Br}-[@{b2}]@{Br2}\lewis{026,
12 Br}}
13 % to the left:
14 \arrow[attack.-135,<=>,2]{\ce{- Br\om}}{\footnotesize
15 slow}
16 \reactant[-135,carbenium_a]{\vflipnext\chemfig{-[: -30]\
17 chembelow{C}{\scriptstyle\oplus}(-[: 30])-[6]C

```

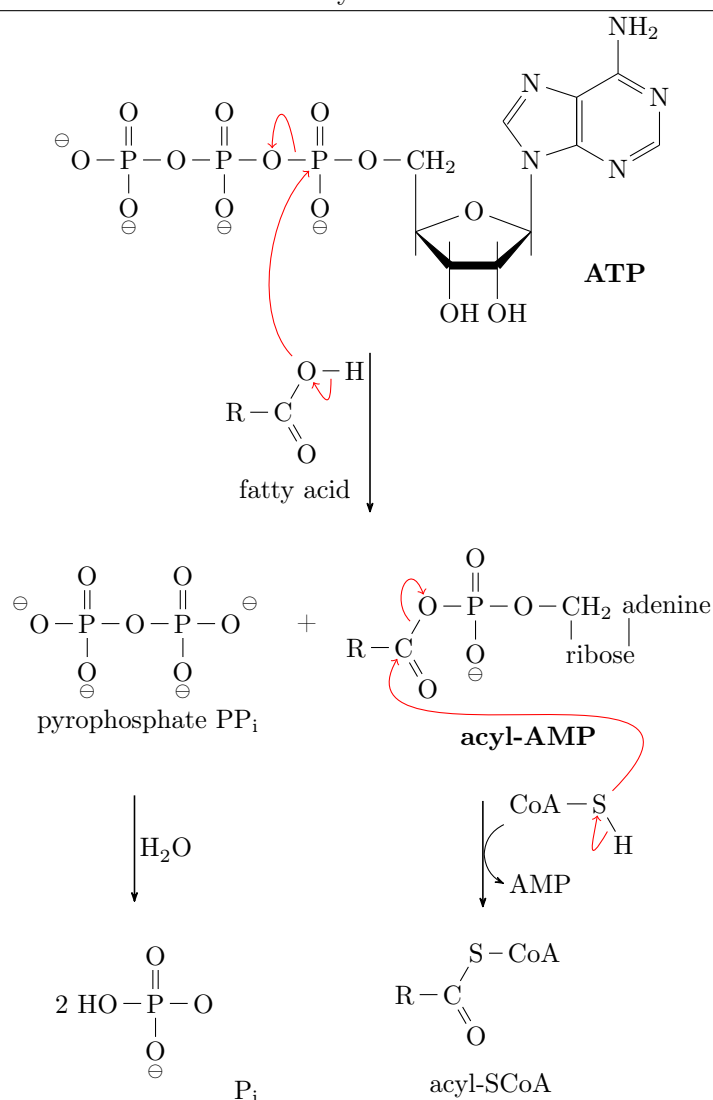
```

      (<[: -150])(<[: -100]) -[: -30]\lewis{137,Br}}
16 \anywhere{below=of carbenium_a}{\footnotesize carbenium
    ion}
17 \arrow[,<=>]{}{}
18 \reactant[,bromonium]{\chemfig{>[: -60]C?(<[:160]) -[6]C
    (<[: -110])(<[: -150]) -[:30]\lewis{17,Br}?-[4,.5,,,
    draw=none]{\scriptstyle\oplus}}}}
19 \anywhere{below=of bromonium,,yshift=.35em}{\
    footnotesize bromonium ion}
20 % to the right:
21 \arrow[attack.-45,<=>,2]{\footnotesize slow}{\ce{- Br\om
    }}
22 \reactant[-45,carbenium_b]{\chemfig{-[: -30]\chemabove{C
    }{\scriptstyle\oplus}(-[:30]) -[6]C(<[: -150])
    (<[: -100]) -[: -30]\lewis{157,Br}}}}
23 \anywhere{below=of carbenium_b}{\footnotesize carbenium
    ion}
24 \arrow[left,<=>]{}{}
25 \mCsetup{reset}
26 \end{rxnscheme}

```

## 10 Activation of Fatty Acids

Reaction scheme 10 Activation of Fatty Acids



```

1 \def\scrom{\scriptstyle\ominus}
2 \begin{rxnscheme}[,H]{Activation of Fatty Acids}
3 \reactant[,ATP]{\chemfig{\chemabove{0}{\hspace*{-5mm}}\scrom}-P(=[2]0)(-[6]\chembelow{0}{\scrom})-O-P(=[2]0)(-[6]\chembelow{0}{\scrom})-@{01}O-[@{b1}]{@{P}}P(=[2]0)(-[6]\chembelow{0}{\scrom})-O-CH_2-[6,1.5,1](-[6,.5])(-[:20,1.3]0?[a])<[7](-[2,.5])(-[6]OH)-[,,,,line width=3pt](-[2,.5])(-[6]OH)>[1]?[a]

```

```

](-[6,.5])-[2,1.5]N?[b]-[:18]([:30]*6(-N=-N(-NH_2)
=-))-[[:90]-[:162]N=^[: -126]?[b]}}
4 \anywhere{below right=of ATP,,xshift=-4em,yshift=3em}{\
  bfseries ATP}
5 \arrow[below,,1.5]{\chemname{\chemfig{R-C(=[: -60]O)
  -[:60]@{02}O-[@{b2}]H}}{fatty acid}}{}}
6 \branch[on chain=going below]{
7   \reactant[,pyrophosphat]{
8     \chemfig{\chemabove{0}{\hspace*{-5mm}\scrom}-P(=[2]O
      )(-[6]\chembelow{0}{\scrom})-O-P(=[2]O)(-[6]\
        chembelow{0}{\scrom})-\chemabove{0}{\hspace*{5mm}
          }\scrom}}
9     \elmove{b1}{100:1cm}{01}{90:5mm}
10    \elmove{02}{135:1cm}{P}{-135:1cm}
11    \elmove{b2}{-90:5mm}{02}{-60:5mm}
12  }
13 \anywhere{below=of pyrophosphat}{pyrophosphate PP$_\
  text{i}$}
14 \chemand
15 \reactant[,acyl-amp]{\chemfig{R-@{C}C(=[: -60]O)-[@{b
  3}:60]@{03}O-P(-[6]\chembelow{0}{\scrom})(=[2]O)-O-
  CH_2-[6,,1,1]r|ibos|e-[2,1.05,3,1]A|denine}}
16 \anywhere{below=of acyl-amp}{\bfseries acyl-AMP}
17 }
18 \branch[on chain=going below,,xshift=-8em]{
19   \arrow[below]{\ce{H2O}}{}}
20   \reactant[below,Pi]{2~\chemfig{HO-P(=[2]O)(-[6]\
    chembelow{0}{\scrom})-O}}
21   \anywhere{below right=of Pi}{P$_\text{i}$}
22 }
23 \branch[,xshift=4em]{
24   \arrow[below,->]{\chemfig{CoA-@{S}S-[@{b4}:-60]H}}{
    AMP}
25   \reactant[below,acyl-SCoA]{
26     \chemfig{R-C(=[: -60]O)-[:60]S-CoA}
27     \elmove{S}{135:2cm}{C}{-135:1cm}
28     \elmove{b3}{-45:5mm}{03}{-70:7mm}
29     \elmove{b4}{-120:7mm}{S}{-100:5mm}
30   }
31   \anywhere{below=of acyl-SCoA}{acyl-SCoA}
32 }
33 \end{rxnscheme}

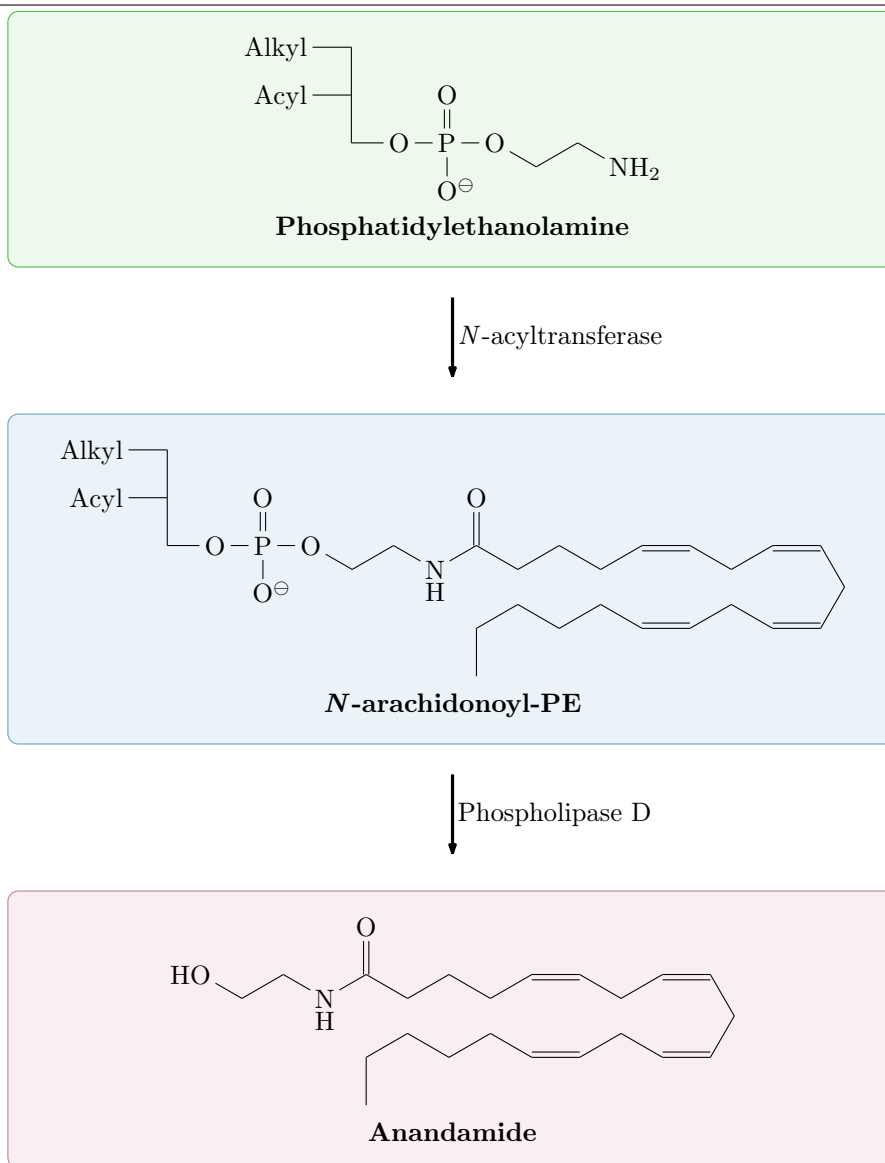
```

## 11 Change the layout with TikZ

---

**Reaction scheme 11** Change the layout with TikZ

---



This is an example for the usage of the <tikz> option. Please take a closer look at lines 5, 7, 11 and 15.

```
1 \begin{rxnscheme}{Change the layout with \TikZ}
2 \colorlet{mCgreen}{green!50!gray}
3 \colorlet{mCblue}{cyan!50!gray}
4 \colorlet{mCred}{magenta!50!gray}
```

```

5 \tikzset{reactant/.style={draw=#1,fill=#1!10,minimum
   width=.8\textwidth,inner sep=1em,rounded corners}}
6 \mCsetup{arrowlength=3em,arrowline=very thick}
7 \reactant[, , reactant=mCgreen]{
8   \chemname{\chemfig{Alky|1--[6](-[4,, ,2]Acy|1)-[6]-O-P
   (= [2]O)(-[6]O|\om)-O-[: -30]-[:30]-[: -30]NH_2)}}{\
   bfseries Phosphatidylethanolamine}
9 }
10 \arrow[below]{}{\textit{N}-acyltransferase}
11 \reactant[below, , reactant=mCblue]{
12   \chemname{\chemfig{Alky|1--[6](-[4,, ,2]Acy|1)-[6]-O-P
   (= [2]O)(-[6]O|\om)-O-[: -30]-[:30]-[: -30]\chembelow{
   N}{H}-[:30](=[2]O)
   -[: -30]-[:30]-[: -30]-[:30]=_[: -30]-[:30]=_[: -60]
   -[: -60]=_[:180]-[: -30]-[: :60]=_[:180]-[: -30]-
   [: :60]-[: -60]-[: :60]-[6]}}{\bfseries\textit{N}-
   arachidonoyl-PE}
13 }
14 \arrow[below]{}{Phospholipase D}
15 \reactant[below, , reactant=mCred]{
16   \chemname{\chemfig{HO-[: -30]-[:30]-[: -30]\chembelow{N
   }{H}-[:30](=[2]O)
   -[: -30]-[:30]-[: -30]-[:30]=_[: -30]-[:30]=_[: -60]
   -[: -60]=_[:180]-[: -30]-[: :60]=_[:180]-[: -30]-
   [: :60]-[: -60]-[: :60]-[6]}}{\bfseries Anandamide}
17 }
18 \mCsetup{reset}
19 \end{rxnscheme}

```

## 12 Claisen-Kondensation

```

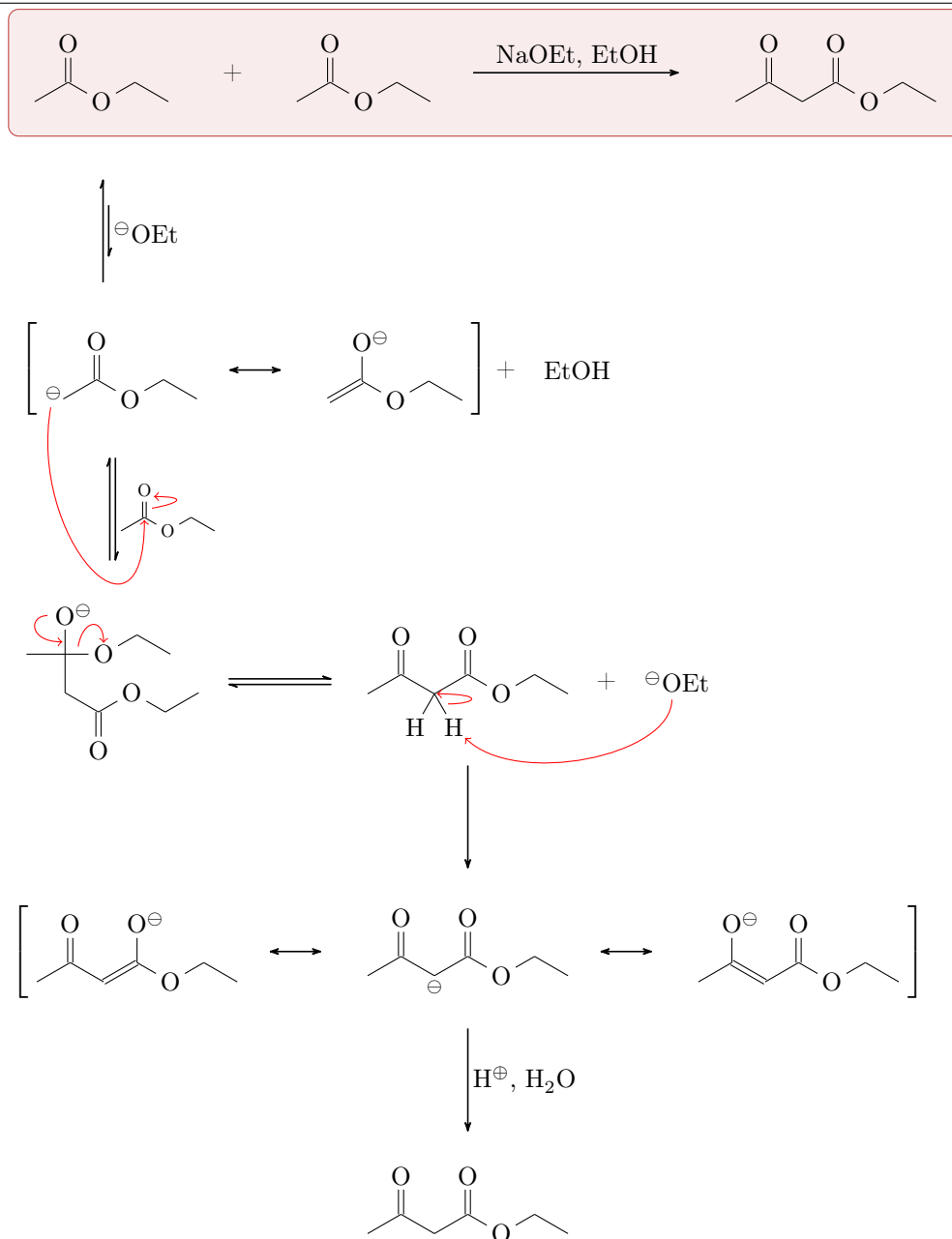
1 \begin{rxnscheme}{Claisen-Kondensation}
2 \colorlet{mCred}{red!50!gray}
3 \setatomsep{1.5em}
4 % Ergebnis:
5 \branch[, one, draw=mCred, fill=mCred!10, rounded corners,
   inner sep=.5em]{
6   \reactant{\chemfig{[:30]-(=[2]O)-[: -30]O--[: -30]}}
7   \chemand
8   \reactant{\chemfig{[:30]-(=[2]O)-[: -30]O--[: -30]}}
9   \arrow[, , 2]{\ce{NaOEt}, \ce{EtOH}}{}
10  \reactant{\chemfig{[:30]-(=[2]O)-[: -30]-(=[2]O)-[: -30]
   O--[: -30]}}

```

---

**Reaction scheme 12** Claisen-Kondensation

---



```

11 }
12 % Mechanismus:
13 \branch[-90,,xshift=-13.5em]{
14   \arrow[-90,<=>]{\ce{}}\om{OEt}}{}
15 }
16 \mesomeric[-90,two,xshift=4.5em]{
17   \reactant{\chemfig{[:30](-[:150,.3,,,draw=none]@{C1}\
18     \scriptstyle\ominus)-([2]O)-[: -30]O--[: -30]}}
19   \marrow
20   \reactant{\chemfig{[:30]=(-[2]O\om)-[: -30]O--[: -30]}}
21 }
22 \chemand
23 \reactant{\ce{EtOH}}
24 \branch[two.-90,three,xshift=-5.5em]{
25   \arrow[-90,<=>,,,both]{\chemfig{[[:30]-@{C
26     2})(@{b1}2]O@{O1})-[: -30]O--[: -30]}}{}
27 }
28 \reactant[three.-90]{\chemfig{-(-[@{b2}2]@{O2}O\om)
29   (-[6]-[: -30]([6]O)-[:30]O-[: -30]-[:30])-[@{b3}]@{O3}
30   O-[:30]-[: -30]}}
31 \arrow[,<=>]{}{}
32 \reactant[,four]{\chemfig{[:30]-([2]O)-[: -30]@{C
33   3})(-[: -120]H)(-[@{b4}:-60]H@{H})-([2]O)-[: -30]O
34   --[: -30]}}
35 \chemand
36 \reactant{\chemfig{\om @{O4}OEt}}
37 \arrow[four.-90]{}{}
38 \mesomeric[-90]{
39   \reactant{\chemfig{[:30]-([2]O)-[: -30]=(-[2]O\om)
40     -[: -30]O--[: -30]}}
41   \marrow
42   \reactant{\chemfig{[:30]-([2]O)-[: -30](-[6,.3,,,draw=
43     none)\scriptstyle\ominus)-([2]O)-[: -30]O--[: -30]}}
44   \marrow
45   \reactant{\chemfig{[:30]-(-[2]O\om)=[: -30]-([2]O)
46     -[: -30]O--[: -30]}}
47 }
48 \arrow[-90]{\Hpl, \ce{H2O}}{}
49 \reactant[-90]{\chemfig{[:30]-([2]O)-[: -30]-([2]O)
50   -[: -30]O--[: -30]}}
51 \anywhere{one.0}{
52   \elmove{C1}{-100:2cm}{C2}{-90:2cm}
53   \elmove{b1}{10:5mm}{O1}{0:5mm}
54   \elmove{O2}{180:5mm}{b2}{180:5mm}

```

```

45     \elmove{b3}{80:5mm}{O3}{90:5mm}
46     \elmove{b4}{0:5mm}{C3}{0:7mm}
47     \elmove{O4}{-90:1cm}{H}{-45:1cm}
48   }
49   \end{rxnscheme}

```

## 13 Extensive Synthesis

As last example we can create extensive syntheses, using the `\merge` command.

```

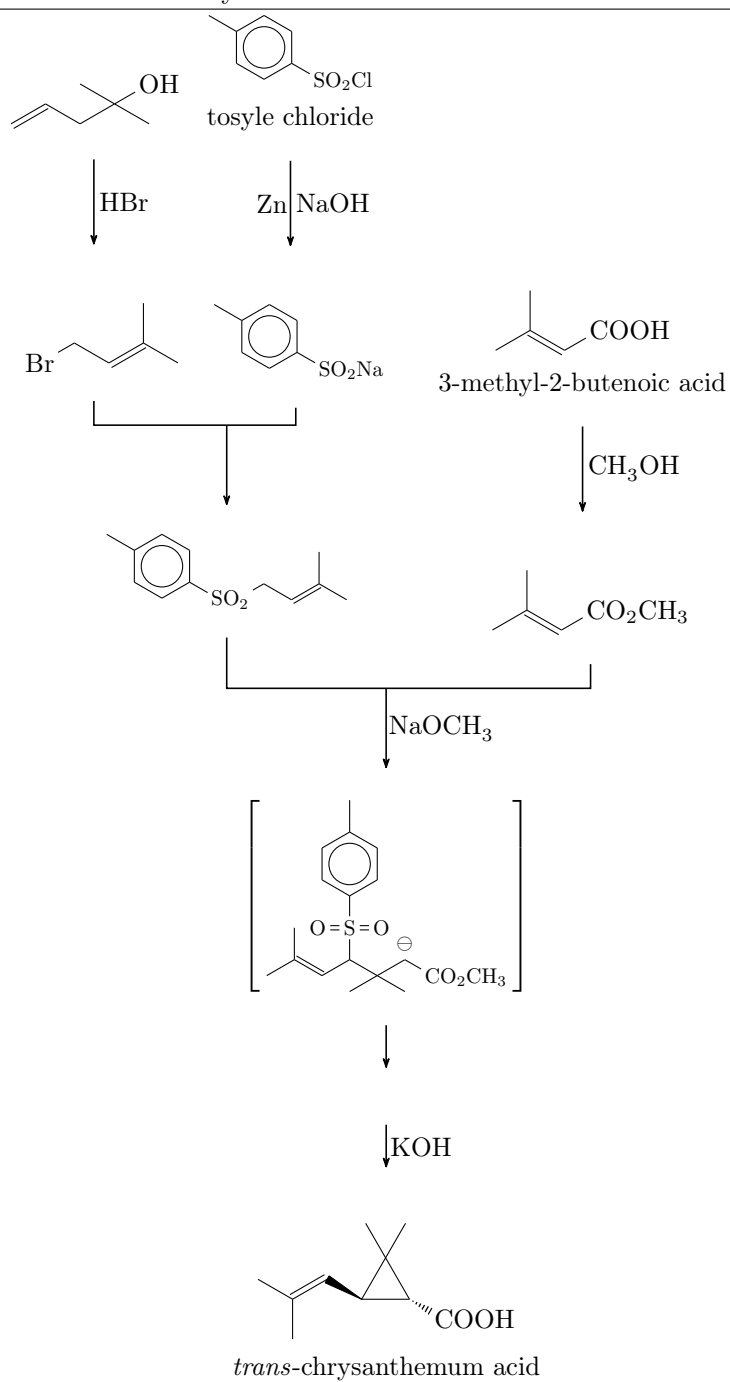
1   \begin{rxnscheme}[,,,8]{Extensive Synthesis}
2     \setatomsep{1.5em}
3     \branch[,start_left]{
4       \reactant{\chemfig{=_{[:30]-[: -60]-[:60](-[: -60])
5         (-[:120]) -[:0]OH}}}
6       \arrow[below]{\ce{HBr}}{}
7       \reactant[below]{\chemfig{Br
8         -[:30]-[: -60]=_{[:60](-[: -60]) -[:60]}}}
9     }
10    \branch[right=of start_left,start_center,yshift=1em]{
11      \reactant{\chemname{\chemfig{[ ] [scale=.8]{**6(---(SO_2
12        Cl)---(-)-)}}}{tosyle chloride}}
13      \arrow[below]{\ce{NaOH}}{\ce{Zn}}
14      \reactant[below]{\chemfig{[ ] [scale=.8]{**6(---(SO_2Na)
15        ---(-)-)}}}
16    }
17    \branch[right=of start_center,start_right,xshift=3em,
18      yshift=-10em]{
19      \reactant{\chemname{\chemfig{-[:30](-[:60])
20        =_{[: -60]-[:60]COOH}}}{3-methyl-2-butenic acid}}
21      \arrow[below]{\ce{CH3OH}}{}
22      \reactant[below]{\chemfig{-[:30](-[:60])
23        =_{[: -60]-[:60]CO_2CH_3}}}
24    }
25    \branch[below=of start_left,target_one,xshift=5em,yshift
26      =-5em]{
27      \reactant{\chemfig{[ ] [scale=.8]{**6(---(SO
28        _2-[:30]-[: -60]=_{[:60](-[:60]) -[: -60])---(-)-)
29        }}}
30    }
31    \branch[below=of target_one,target_two,xshift=6em,yshift
32      =-6em]{
33      \mesomeric{\chemfig{[ ] [scale=.8]{-[:30](-[:60])
34        =^[: -60]-[:60](-[:60]S(=[[:90]O)(=[[: -90]O)
35        -[:0]**6(---(-)---)) -[: -60](-[:0])(-[: -120])

```

---

Reaction scheme 13 Extensive Synthesis

---



```

-[::60](-[::60,.5,,,white]\ominus)-[::-60]CO_2CH
_3}}
23 \arrow[below,,, .5]{}{}
24 \arrow[below,,, .5]{\ce{KOH}}{}
25 \reactant[below]{\chemname{\chemfig{-[::-30](-[::-60])
=^[::60]>[::-60](-[::90,1.2])
-[::30,1.2](-[::120,1.2](-[::-60])-[::0])<[::-30]
COOH)}}{\emph{trans}-chrysanthemum acid}}
26 }
27 \merge{target_one}{start_left}{start_center}
28 \merge{\ce{NaOCH3}}{target_two}{target_one}{start_right}
29 \end{rxnscheme}

```

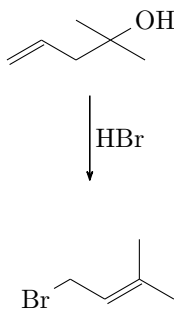
Let's go through the code, piece by piece.

```

1 \begin{rxnscheme}[,,, .8]{Extensive Synthesis}
2 \setatomsep{1.5em}
3 \branch[,start_left]{
4 \reactant{\chemfig{=_{[::30]-[::-60]-[::60](-[::-60])
(-[::120])-[::0]OH}}}
5 \arrow[below]{\ce{HBr}}{}
6 \reactant[below]{\chemfig{Br
-[::30]-[::-60]=_{[::60](-[::-60])-[::60]}}
7 }

```

In lines 1 and 2 we begin the environment and make sure, that the formulæ don't become too big. In lines 3 to 7 the first two reactants are written (lines 4 and 6) and connected with an arrow (line 5).

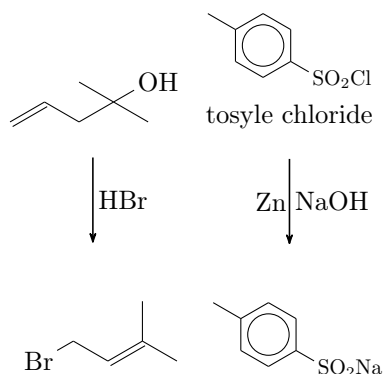


```

8 \branch[right=of start_left,start_center,yshift=1em]{
9 \reactant{\chemname{\chemfig{[ ] [scale=.8]**6(---(SO_2
Cl)---(-)-)}}{tosyle chloride}}
10 \arrow[below]{\ce{NaOH}}{\ce{Zn}}
11 \reactant[below]{\chemfig{[ ] [scale=.8]**6(---(SO_2Na)
---(-)-)}}
12 }

```

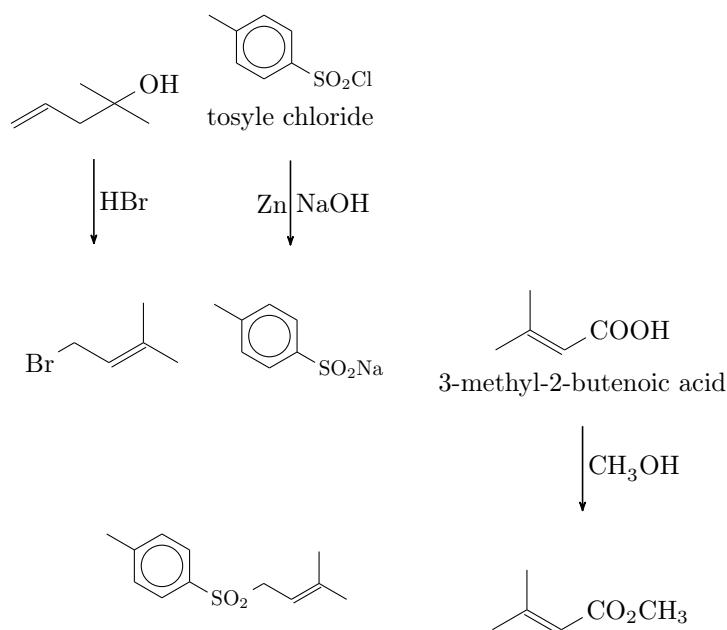
In the following lines 8 to 12, we create the second branch of the synthesis.



```

13  \branch[right=of start_center,start_right,xshift=3em,
    yshift=-10em]{
14    \reactant{\chemname{\chemfig{-[:30](-[:60])
    =_[: -60] -[:60] COOH}}}{3-methyl-2-butenic acid}}
15    \arrow[below]{\ce{CH3OH}}{ }
16    \reactant[below]{\chemfig{-[:30](-[:60])
    =_[: -60] -[:60] CO_2CH_3}}
17  }
18  \branch[below=of start_left,target_one,xshift=5em,yshift
    =-5em]{
19    \reactant{\chemfig{}}[scale=.8]**6(--(-SO
    _2-[:30] -[: -60]=_[:60](-[:60]) -[: -60]) ---(-) -)
    }}
20  }
```

In lines 13 to 20 we create the third branch and the product of the first two branches.

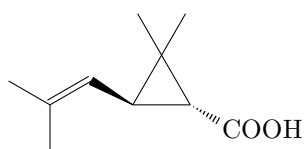
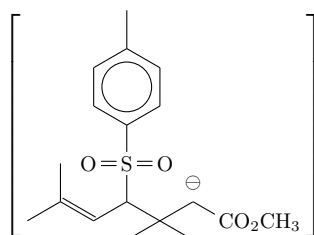
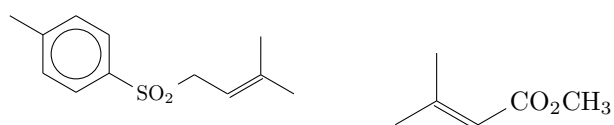


```

21 \branch[below=of target_one,target_two,xshift=6em,yshift
    =-6em]{
22 \mesomeric{\chemfig{}}[scale=.8]{-[:30](-[:60])
    =^[: -60]-[:60](-[:60]S(=[:90]O)(=[: -90]O)
    -[:0]**6(---(-)---))-[: -60](-[:0])(-[: -120])
    -[:60](-[:60,.5,,,white]\ominus)-[: -60]CO_2CH_3}}
23 \arrow[below,,.5]{}{}
24 \arrow[below,,.5]{\ce{KOH}}{}
25 \reactant[below]{\chemname{\chemfig{-[: -30](-[: -60])
    =^[:60]>[: -60](-[:90,1.2])
    -[:30,1.2](-[:120,1.2](-[: -60])-[:0])<[: -30]
    COOH}}}{\emph{trans}-chrysanthemum acid}}
26 }

```

In lines 21 to 26 we create the last branch.



*trans*-chrysanthemum acid

Finally, the different branches are merged, the second merging arrow gets a label and the environment is ended.

```

27   \merge{target_one}{start_left}{start_center}
28   \merge[\ce{NaOCH3}]{target_two}{target_one}{start_right}
29   \end{rxnscheme}

```