1) HCO₂Et, NaOMe, 84%
2) TsN₃, Et₃N, rt, 80%
3) hν, MeOH, 71%

1) AgBF₄, Al₂O₃, CCl₄
2) TsOH, benzene, 80 °C
3) hν
ether-pentane

1) P(OEt)₃ (3.0 eq.), PhMe, reflux, 7 hr
2) TMSBr, PhMe, 10 °C, 2 hr, 87% (2 steps)
3) Pd/C, Et₃SiH, CH₂Cl₂, 10 °C, 1 hr, 57%
4) DIPEA, LiCl, MeCN, 25 °C, 17 hr, 88%

1) DEAD, DMF, 97%
2) PPh₃, CH₂Cl₂, 0 °C; PhCO₂H, 67%

KCN (> 1 eq)
H₂O, EtOH, 150 °C
sealed tube
HO₂C
Br
40%

HO₂C
Br
trace
Fukuyama Group - Group Meeting Problems

12/17/2003

1

\[
\text{Ph}^+\text{SO}_4^- + R\_\text{CHO} \xrightarrow{(2 \text{ eq})} \xrightarrow{Et_2\text{NH (2 eq)}}, \text{AcOH (0.5 eq)}\text{propanenitrile}\text{+ rt, 6 h} \rightarrow R\_\text{ALD}
\]

\text{R = n-Bu} \quad 82% \quad \text{* Used as a solvent}

2

\[
\begin{align*}
\text{AcO} & \quad \text{Me} \\
\text{hv (pyrex)} & \quad \text{acetone} \\
5 \^\circ & \quad 88% \\
\text{rt} & \quad 100%
\end{align*}
\]

\text{1) hv (pyrex) acetone 5 \^\circ, 88%} \\
\text{2) 4\% aq. KOH rt, 100%}

\text{Tricyclic Compound}

\text{1) Al(O-i-Pr)_3, i-PrOH reflux, 91%} \\
\text{2) TsCl (1.3 eq) pyridine, rt, 89%} \\
\text{3) i-PrLi (5 eq) pentane, rt, 55%}

3

\[
\begin{align*}
\text{TESO} & \quad \text{R} \\
\text{CO (800 psi)} & \quad \text{i-Pr}_2\text{NEt} \\
\text{PhCN} & \quad 56% \\
65 & \quad 110 \^\circ
\end{align*}
\]

3

\[
\begin{align*}
\text{SiMe}_3 & \quad \text{EtO} \\
\text{SiMe}_3 & \quad \text{OH} \\
\text{EtO, -78 to 0 \^\circ} & \quad \text{Ti(O-i-Pr)_4, i-PrMgCl (2 eq)}
\end{align*}
\]

\[
\begin{align*}
\text{MeO} & \quad \text{OMe} \\
\text{PhMe, \Delta} & \quad 74%
\end{align*}
\]

5

\[
\begin{align*}
\text{Bu}_3\text{SnH, AIBN} & \quad \text{PhMe, \Delta}
\end{align*}
\]

\[
\begin{align*}
\text{COOMe} & \quad \text{COOMe} \\
\text{MeO} & \quad \text{OMe}
\end{align*}
\]