Supporting Information

Metal-free Oxidative Esterification of Ketones and Potassium Xanthates: Selective Synthesis of α-Ketoesters and Esters

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Control Experiments

The detection of intermediate M

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\begin{align*}
\text{(o-Ethyl carbonothioic) 2-oxo-2-phenylacetic thioanhydride} & \quad (\text{intermediate M}): \quad \text{MS (EI, 70 eV) } m/z: \\
& \quad 254, 105, 77, 51; \quad \text{ESI-HRMS (m/z): } [M+H]^+ \text{ calcld for } C_{11}H_{11}O_3S_2, 255.0144, \text{ found: } 255.0151. \\
\text{MS spectra:} & \\
\text{HRMS spectra:}
\end{align*}
\]
NMR spectra for all compounds

$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3a

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3a
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3b

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3b
**1H NMR (500 MHz, CDCl₃) spectrum of compound 3c**

![1H NMR spectrum](image)

**13C NMR (125 MHz, CDCl₃) spectrum of compound 3c**

![13C NMR spectrum](image)
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3d

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3d
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3e

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3e
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3f

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3f
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3g

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3g
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3h

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3h
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3i

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3i
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3j

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3j
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3k

![H NMR spectrum of compound 3k](image)

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3k

![C NMR spectrum of compound 3k](image)
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3l

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3l
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3m

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3m
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3n

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3n
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3o

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3o
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3p

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3p
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3q

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3q
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3r

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3r
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3s

$^1$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3s
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3t

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3t
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3u

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3u
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3v

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3v
DEPT 135 spectrum of compound 3v

![Diagram of compound structure]

- 139.945
- 129.944
- 128.015
- 72.948
- 72.727
- 15.980

C₈H₃O₃C₃H₅
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3w

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3w
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3y

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3y
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3z

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3z
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 4a

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 4a
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 4b

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 4b
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 4c

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 4c
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 4d

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 4d
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 4e

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 4e
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 4f

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 4f
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 4g

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 4g
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 4h

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 4h
\(^1\)H NMR (500 MHz, CDCl\(_3\)) spectrum of compound 4i

\(^{13}\)C NMR (125 MHz, CDCl\(_3\)) spectrum of compound 4i
$\text{C NMR (125 MHz, CDCl}_3\text{) spectrum of compound 4j}$

![C NMR spectrum of compound 4j](image)

$\text{C NMR (125 MHz, CDCl}_3\text{) spectrum of compound}$

![C NMR spectrum of compound](image)
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 4k

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 4k
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 6a

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 6a
$^1$H NMR (500 MHz, CDCl₃) spectrum of compound 6a

$^{13}$C NMR (125 MHz, CDCl₃) spectrum of compound 6b
\( ^{1}H \) NMR (500 MHz, CDCl\(_3\)) spectrum of compound 14

\( ^{13}C \) NMR (125 MHz, CDCl\(_3\)) spectrum of compound 14
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 18

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 18
$^1$H NMR (500 MHz, CDCl$_3$) spectrum of compound 3ab

$^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of compound 3ab