Boronic acid / Brønsted acid co-catalyst systems for the synthesis of 2H-chromenes from phenols and α,β-unsaturated carbonyls

Victoria Dimakos, Tishaan Singh and Mark S. Taylor*

Department of Chemistry, Lash Miller Laboratories, University of Toronto
80 St. George St., Toronto ON M5S 3H6 Canada

mtaylor@chem.utoronto.ca

Electronic Supplementary Information

Contents

Copies of $^1$H and $^{13}$C NMR spectra for synthesized compounds
6a

$^1$H NMR, CDCl$_3$, 500 MHz

6a

$^{13}$C NMR, CDCl$_3$, 126 MHz
**6b**

\[ \text{MeO} \quad \text{MeO} \]

\[ \text{MeO} \]

\[ \text{MeO} \]

\[ \text{H(NMR, CDCl}_3, 400 \text{ MHz} \]

---

**6b**

\[ \text{MeO} \quad \text{MeO} \]

\[ \text{MeO} \]

\[ \text{MeO} \]

\[ \text{C(NMR, CDCl}_3, 100 \text{ MHz} \]
$^1$H NMR, CDCl$_3$, 400 MHz

$^1$C NMR, CDCl$_3$, 100 MHz
$^1$H NMR, CDCl$_3$, 400 MHz

$^{13}$C NMR, CDCl$_3$, 100 MHz
$^1$H NMR, CDCl$_3$, 400 MHz

$^{13}$C NMR, CDCl$_3$, 100 MHz
$^1$H NMR, CDCl$_3$, 400 MHz

$^{13}$C NMR, CDCl$_3$, 100 MHz
6g

$^1$H NMR, CDCl$_3$, 400 MHz

6g

$^{13}$C NMR, CDCl$_3$, 100 MHz
$^1$H NMR, CDCl$_3$, 500 MHz

$^{13}$C NMR, CDCl$_3$, 126 MHz
$^{1}H$ NMR, CDCl$_3$, 500 MHz

$^{13}C$ NMR, CDCl$_3$, 126 MHz
$^{1}H$ NMR, CDCl$_3$, 500 MHz
$^1$H NMR, CDCl$_3$, 400 MHz

$^{13}$C NMR, CDCl$_3$, 100 MHz
$^1$H NMR, CDCl$_3$, 500 MHz

$^{13}$C NMR, CDCl$_3$, 126 MHz
$^{1}H$ NMR, CDCl$_3$, 500 MHz
4a

\[ \text{MeO} \]

\[ \text{Me} \]

\[ \text{MeO} \]

\[ \text{Me} \]

\[ \text{MeO} \]

\[ \text{H(NMR, CDCl}_3, 500 \text{ MHz}\]

\[ 1^\text{H NMR, CDCl}_3, 500 \text{ MHz}\]

\[ f_1 \text{ (ppm)} \]

\[ 0 \quad 11.0 \quad 10.0 \quad 9.0 \quad 8.0 \quad 7.0 \quad 6.0 \quad 5.0 \quad 4.0 \quad 3.0 \quad 2.0 \quad 1.0 \quad 0.0 \quad -1 \]

\[ 13^\text{C NMR, CDCl}_3, 126 \text{ MHz}\]

\[ f_1 \text{ (ppm)} \]

\[ 0 \quad 210 \quad 200 \quad 190 \quad 180 \quad 170 \quad 160 \quad 150 \quad 140 \quad 130 \quad 120 \quad 110 \quad 100 \quad 90 \quad 80 \quad 70 \quad 60 \quad 50 \quad 40 \quad 30 \quad 20 \quad 10 \quad 0 \quad -1 \]
$^1$H NMR, CDCl$_3$, 500 MHz

$^{13}$C NMR, CDCl$_3$, 126 MHz
$4c$

$\text{MeO}$

$\text{Ph}$

$\text{O}$

$\text{Ph}$

$\text{H(NMR, CDCl}_3$, 500 MHz

$\text{13C NMR, CDCl}_3$, 126 MHz
$^{1}$H NMR, CDCl$_3$, 500 MHz

$^{13}$C NMR, CDCl$_3$, 126 MHz
4e

$^1$H NMR, CDCl$_3$, 500 MHz

4e

$^{13}$C NMR, CDCl$_3$, 126 MHz
$^1$H NMR, CDCl₃, 500 MHz

$^{13}$C NMR, CDCl₃, 126 MHz
$^{1}$H NMR, CDCl$_3$, 500 MHz

$^{13}$C NMR, CDCl$_3$, 126 MHz