Electronic Supplementary Information (ESI)

Modular synthesis of polyene side chain analogues of the potent macrolide antibiotic etnangien by a flexible coupling strategy based on hetero-bis-metallated alkenes†

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Contents

Copies of 1H and 13C NMR spectra.
Bu₃SnOH

16a

solvent: CDCl₃
nucleus: ¹H
frequency: 300.132 MHz
solvent: CDCl₃
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl$_3$

nucleus: $^1$H

frequency: 300.132 MHz
Bu₃Sn−OH

16b

solvent: CDCl₃
nucleus: $^{13}$C
frequency: 75.48 MHz
Bu$_3$SnOH

16c

solvent: CDCl$_3$
nucleus: $^1$H
frequency: 300.132 MHz
$$\text{Bu}_3\text{Sn} \rightarrow \text{OH}$$

16c

solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 75.48 MHz
Bu₃SnOH

solvent: CDCl₃
nucleus: ¹H
frequency: 500.130 MHz
Bu$_3$Sn$\equiv\text{CH}$

solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 125.78 MHz
Bu$_3$Sn$\equiv$\text{OH}

16e

solvent: CDCl$_3$
nucleus: $^1$H
frequency: 300.13 MHz
solvent: CDCl₃
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl₃
nucleus: ^1^H
frequency: 300.132 MHz
solvent: CDCl₃
nucleus: $^{13}$C
frequency: 75.48 MHz
Bu₃Sn–O

12a

solvent: CDCl₃
nucleus: ¹H
frequency: 300.132 MHz
solvent: CDCl$_3$

nucleus: $^{13}$C

frequency: 75.48 MHz
solvent: CDCl$_3$

nucleus: $^1$H

frequency: 300.132 MHz
Bu$_3$Sn$\equiv\equiv$O

12b

solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 75.48 MHz
12d

solvent: CDCl$_3$

nucleus: $^1$H

frequency: 300.132 MHz
$\text{Bu}_3\text{Sn} \leftrightarrow \text{O}$

12d

solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl$_3$

nucleus: $^1$H

frequency: 300.132 MHz
Bu₃Sn\(\equiv\)CH\(\equiv\)CO

12e

solvent: CDCl₃
nucleus: 
frequency: 75.48 MHz
Bu₃Sn

12f

solvent: CDCl₃
nucleus: ¹H
frequency: 300.132 MHz
solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl$_3$

nucleus: $^1$H

frequency: 300.132 MHz
solvent: CDCl₃
nucleus: ¹³C
frequency: 100.61 MHz
6a

solvent: CDCl$_3$
nucleus: $^1$H
frequency: 300.132 MHz
solvent: CDCl$_3$

nucleus: $^{13}$C

frequency: 75.48 MHz
Bu₃Sn

6b

solvent: CDCl₃
nucleus: ¹H
frequency: 300.132 MHz
solvent: CDCl$_3$

nucleus: $^1$C

frequency: 75.48 MHz
solvent: CDCl$_3$

nucleus: $^1$H

frequency: 300.132 MHz
solvent: CDCl₃
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl₃
nucleus: ¹H
frequency: 300.132 MHz

Electronic Supplementary Material (ESI) for Organic & Biomolecular Chemistry
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solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl₃
nucleus: ¹H
frequency: 300.132 MHz
solvent: CDCl$_3$

nucleus: $^{13}$C

frequency: 75.48 MHz
solvent: CDCl$_3$
nucleus: $^1$H
frequency: 300.132 MHz
solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl₃
nucleus: ¹H
frequency: 300.132 MHz
solvent: CDCl$_3$

nucleus: $^{13}$C

frequency: 75.48 MHz
21a

solvent: CDCl$_3$
nucleus: $^1$H
frequency: 300.132 MHz
solvent: CDCl₃
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl₃
nucleus: ¹H
frequency: 300.132 MHz
solvent: CDCl$_3$

nucleus: $^1$H

frequency: 300.132 MHz
solvent: CDCl$_3$
nucleus: $^1$H
frequency: 300.132 MHz
solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl₃  
nucleus: ¹H  
frequency: 300.132 MHz
solvent: CDCl₃
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl$_3$
nucleus: $^1$H
frequency: 300.132 MHz
solvent: CDCl$_3$

nucleus: $^{13}$C

frequency: 75.48 MHz
solvent: CDCl₃
nucleus: ¹H
frequency: 500.130 MHz
solvent: CDCl₃
nucleus: $^{13}$C
frequency: 125.76 MHz
solvent: CDCl$_3$
nucleus: $^1$H
frequency: 300.132 MHz
solvent: CDCl$_3$

nucleus: $^{13}$C

frequency: 75.48 MHz
solvent: CDCl$_3$

nucleus: $^1$H

frequency: 300.132 MHz
solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 75.48 MHz
21b

solvent: CDCl₃
nucleus: ¹H
frequency: 300.132 MHz
solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl₃
nucleus: \(^1\)H
frequency: 300.132 MHz
solvent: CDCl$_3$

nucleus: $^1$H

frequency: 300.132 MHz
solvent: CDCl₃
nucleus: ¹H
frequency: 300.132 MHz
solvent: CDCl$_3$

nucleus: $^{13}$C

frequency: 75.48 MHz
54

solvent: CDCl$_3$
nucleus: $^1$H
frequency: 300.132 MHz
solvent: CDCl$_3$

nucleus: $^{13}$C

frequency: 75.48 MHz
solvent: CDCl$_3$
nucleus: $^1$H
frequency: 300.13 MHz
solvent: CDCl₃
nucleus: ¹³C
frequency: 75.48 MHz
solvent: CDCl$_3$

nucleus: $^1$H

frequency: 300.132 MHz
solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl$_3$

nucleus: $^1$H

frequency: 300.132 MHz
solvent: CDCl₃
nucleus: ¹H
frequency: 300.132 MHz
solvent: CDCl$_3$

nucleus: $^1$H

cfrequency: 300.132 MHz
solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl₃
nucleus: ¹H
frequency: 300.132 MHz
solvent: CDCl₃
nucleus: ¹³C
frequency: 75.48 MHz
solvent: CDCl$_3$

nucleus: $^1$H

frequency: 300.132 MHz
solvent: CDCl$_3$

nucleus: $^{13}$C

frequency: 75.48 MHz
solvent: CDCl₃
nucleus: ¹H
frequency: 300.132 MHz
solvent: CDCl$_3$

nucleus: $^{13}$C

frequency: 75.48 MHz
solvent: CDCl$_3$
ucleus: $^1$H
frequency: 300.132 MHz
solvent: CDCl$_3$

nucleus: $^{13}$C

frequency: 75.48 MHz
solvent: CDCl$_3$

nucleus: $^1$H

frequency: 300.132 MHz
solvent: CDCl₃
nucleus: ¹³C
frequency: 75.48 MHz
solvent: CDCl₃
nucleus: ¹H
frequency: 300.132 MHz
solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl₃
nucleus: ¹H
frequency: 300.132 MHz
solvent: CDCl$_3$

nucleus: $^1$H

frequency: 300.132 MHz
solvent: CDCl$_3$
nucleus: $^1$H
frequency: 300.132 MHz
solvent: CDCl₃
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl$_3$
nucleus: $^1$H
frequency: 300.132 MHz
solvent: CDCl₃
nucleus: ¹³C
frequency: 75.48 MHz
10

E/Z = 7:1

solvent: CDCl₃
nucleus: ¹H
frequency: 300.132 MHz
**10**

$E/Z = 7:1$

solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl₃
nucleus: ¹H
frequency: 300.132 MHz
solvent: CDCl₃
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl₃
nucleus: 'H
frequency: 300.132 MHz
solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl₃
nucleus: ¹H
frequency: 300.132 MHz
solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl₃
nucleus: "H
frequency: 300.132 MHz
solvent: CDCl$_3$

nucleus: $^1$H

frequency: 300.13 MHz
solvent: CDCl$_3$
nucleus: $^1$H
frequency: 300.132 MHz
solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl₃
nucleus: ^1\text{H}
frequency: 300.132 MHz
solvent: CDCl₃  
nucleus: $^{13}$C  
frequency: 75.48 MHz
solvent: CDCl$_3$

nucleus: $^1$H

frequency: 300.132 MHz
solvent: CDCl$_3$

nucleus: $^{13}$C

frequency: 75.48 MHz
solvent: CDCl$_3$

nucleus: $^1$H

frequency: 300.132 MHz
solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl$_3$

nucleus: $^1$H

frequency: 300.132 MHz
solvent: CDCl$_3$

nucleus: $^{13}$C

frequency: 75.48 MHz

$E/Z = 8:1$
solvent: CDCl$_3$

nucleus: $^1$H

frequency: 600.130 MHz
solvent: CDCl$_3$

nucleus: $^{13}$C

frequency: 75.48 MHz
solvent: CDCl$_3$

nucleus: $^1$H

frequency: 300.132 MHz
solvent: CDCl₃
nucleus: $^{13}\text{C}$
frequency: 75.48 MHz
solvent: CDCl$_3$

nucleus: $^1$H

frequency: 600.130 MHz
38a

solvent: CDCl₃
nucleus: ¹³C
frequency: 150.90 MHz
38b

solvent: CDCl$_3$

nucleus: $^1$H

frequency: 300.132 MHz
solvent: CDCl$_3$

nucleus: $^{13}$C

frequency: 75.48 MHz
solvent: CDCl$_3$
nucleus: $^1$H
frequency: 500.132 MHz
39a

solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 125.76 MHz
solvent: CDCl₃
nucleus: ¹H
frequency: 600.130 MHz
solvent: CDCl₃
nucleus: $^{13}$C
frequency: 150.90 MHz
solvent: CDCl$_3$
nucleus: $^1$H
frequency: 500.132 MHz
solvent: CDCl$_3$

nucleus: $^{13}$C

grequency: 125.76 MHz
4b

solvent: CDCl$_3$
nucleus: $^1$H
frequency: 500.132 MHz
solvent: CDCl₃
nucleus: $^{13}$C
frequency: 125.76 MHz
solvent: CDCl₃
nucleus: ^1^H
frequency: 399.982 MHz
solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 150.90 MHz
solvent: CDCl$_3$
nucleus: $^1$H
frequency: 300.13 MHz
solvent: CDCl$_3$

nucleus: $^{13}$C

frequency: 150.90 MHz
solvent: CDCl₃
nucleus: ¹H
frequency: 300.132 MHz
solvent: CDCl<sub>3</sub>
nucleus: <sup>13</sup>C
frequency: 75.48 MHz
solvent: CDCl₃
nucleus: 'H
frequency: 300.132 MHz
solvent: CDCl₃
nucleus: $^{13}$C
frequency: 75.48 MHz
solvent: CDCl$_3$

nucleus: $^1$H

total frequency: 600.130 MHz
solvent: CDCl$_3$

nucleus: $^{13}$C

frequency: 150.90 MHz
solvent: CDCl$_3$
nucleus: $^1$H
frequency: 600.130 MHz
solvent: CDCl$_3$
nucleus: $^{13}$C
frequency: 150.90 MHz