Electronic Supplementary Material (ESI) for RSC Advances.

New Sterically Hindered Tin(IV) Siloxane Precursors to Tinsilicate Materials: Synthesis, Spectral, Structural and Photocatalytic Studies†‡

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Table S1. ^{119}Sn and ^{29}Si NMR chemical shift values for tin(IV) siloxanes **1**–**8**.

Compounds	δ(^{119}Sn) ppm	δ(^{29}Si) ppm	Reference
1	-149.60	-93.60	[1, 2]
2	-149.54	-93.37	[3, 1]
3	-148.98	-92.09	[4, 5]
4	-150.23	-91.62	[5, 6]
5	-151.31	-91.33	[7, 4]
6	-151.67	-91.32	[7, 2]
7	-151.34	-20.01	[8, 9]
8	-151.27	-20.08	[8, 9]

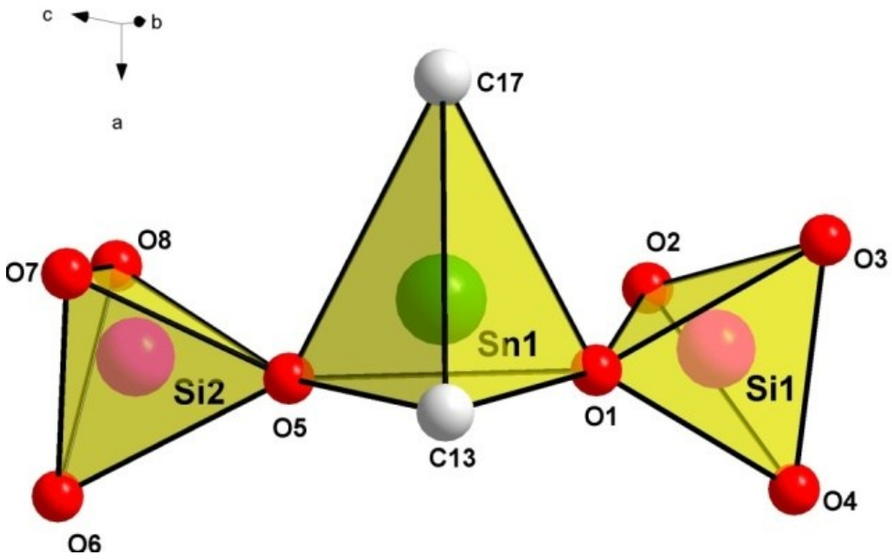


Figure S1. Geometry of tin and silicon in (^{t}Bu)$_2$Sn(OSi(O^{t}Bu)$_3$)$_2$ (**1**).

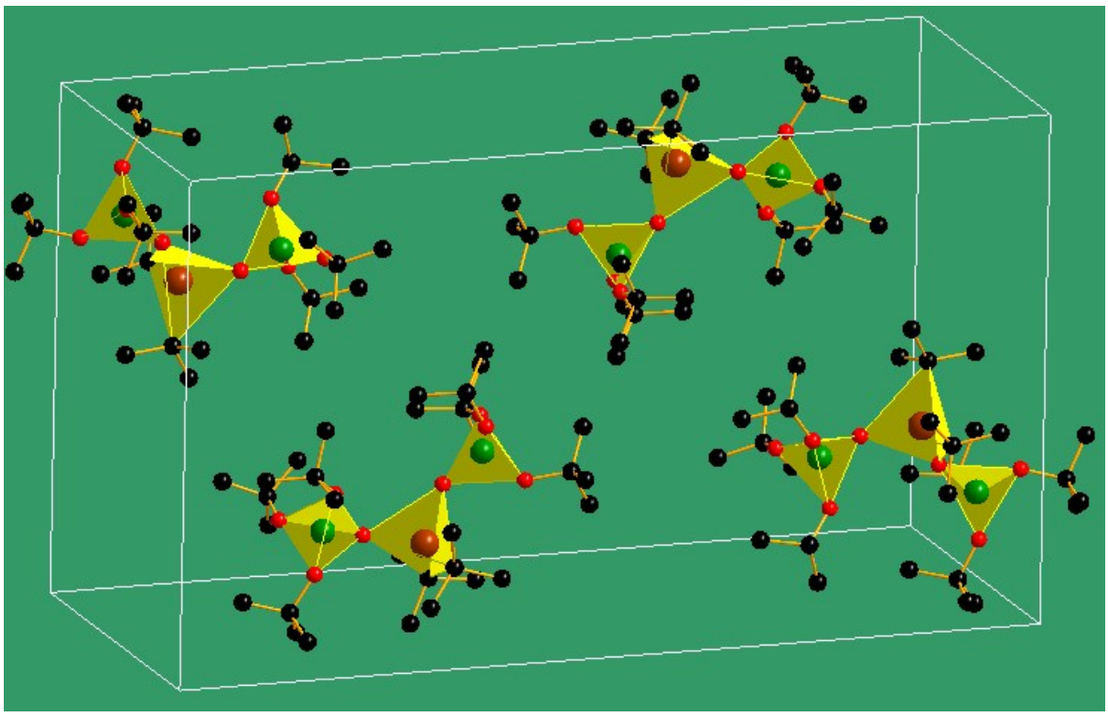


Figure S2. Unite cell packing pattern in [(^{t}Bu)$_2$Sn(OSi(O^{t}Bu)$_3$)$_2$] (**1**) hydrogen atoms are omitted for clarity.

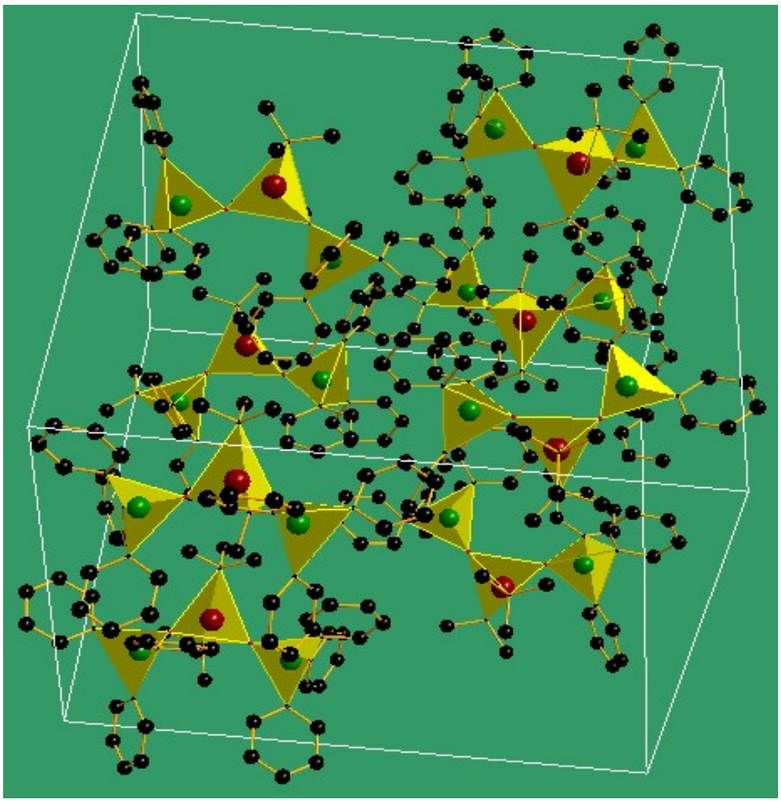


Figure S3. Unite cell packing pattern in [(^{t}Bu)$_2$Sn(OSiPh$_3$)$_2$] (**7**) hydrogen atoms are omitted for clarity.

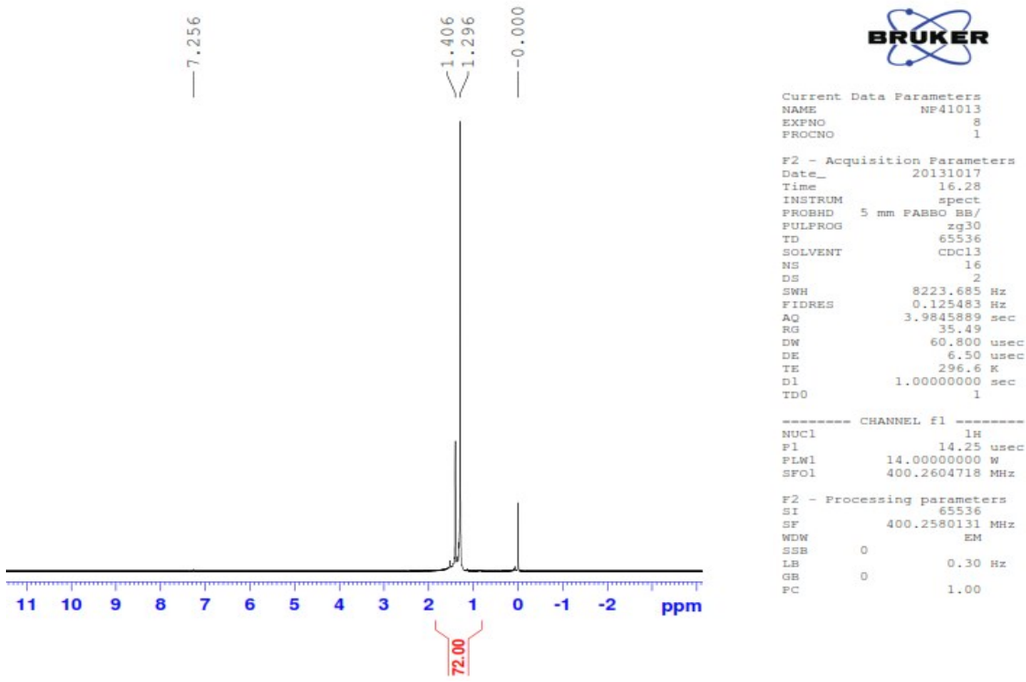


Figure S4. ^{1}H NMR spectrum of [(^{t}Bu)$_2$Sn(OSi(O^{t}Bu)$_3$)$_2$] (**1**) in $CDCl_3$.

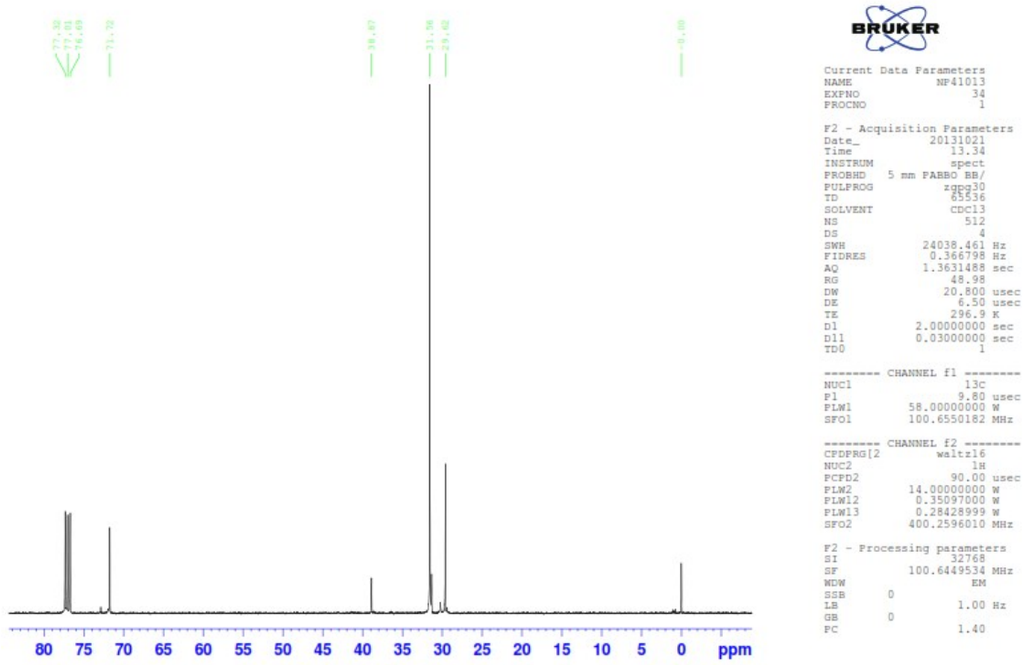


Figure S5. ^{13}C NMR spectrum of [(^{t}Bu)$_2$Sn(OSi(O^{t}Bu)$_3$)$_2$] (**1**) in $CDCl_3$.

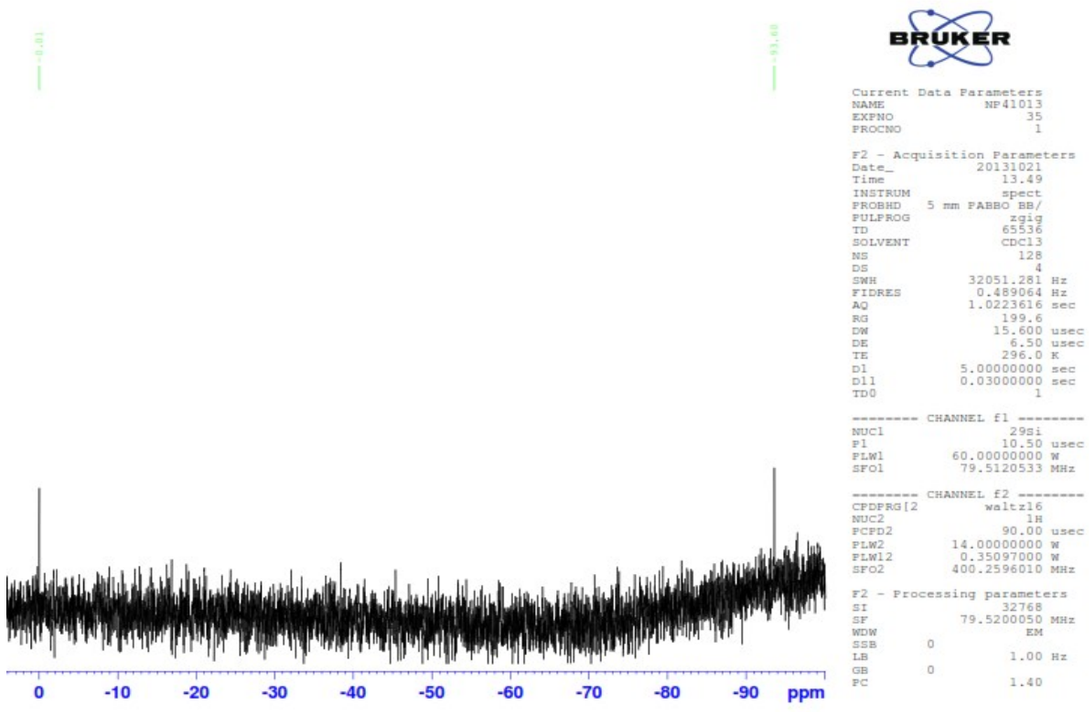


Figure S6. ^{29}Si NMR spectrum of [(^{t}Bu)$_2$Sn(OSi(O^{t}Bu)$_3$)$_2$] **1** in $CDCl_3$.

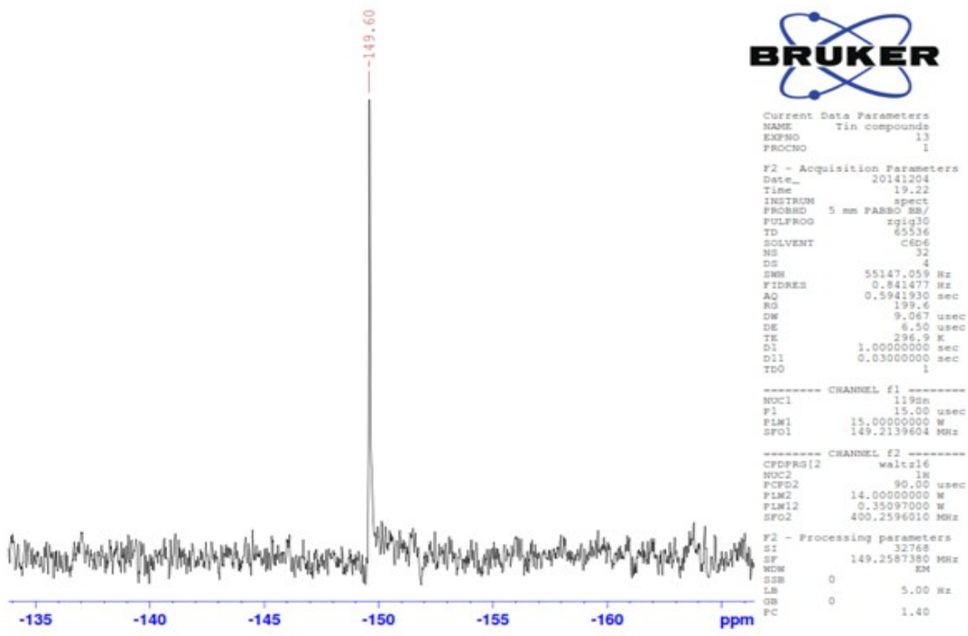


Figure S7. ^{119}Sn NMR spectrum of [(^{t}Bu)$_2$Sn(OSi(O^{t}Bu)$_3$)$_2$] (**1**) in C_6D_6.

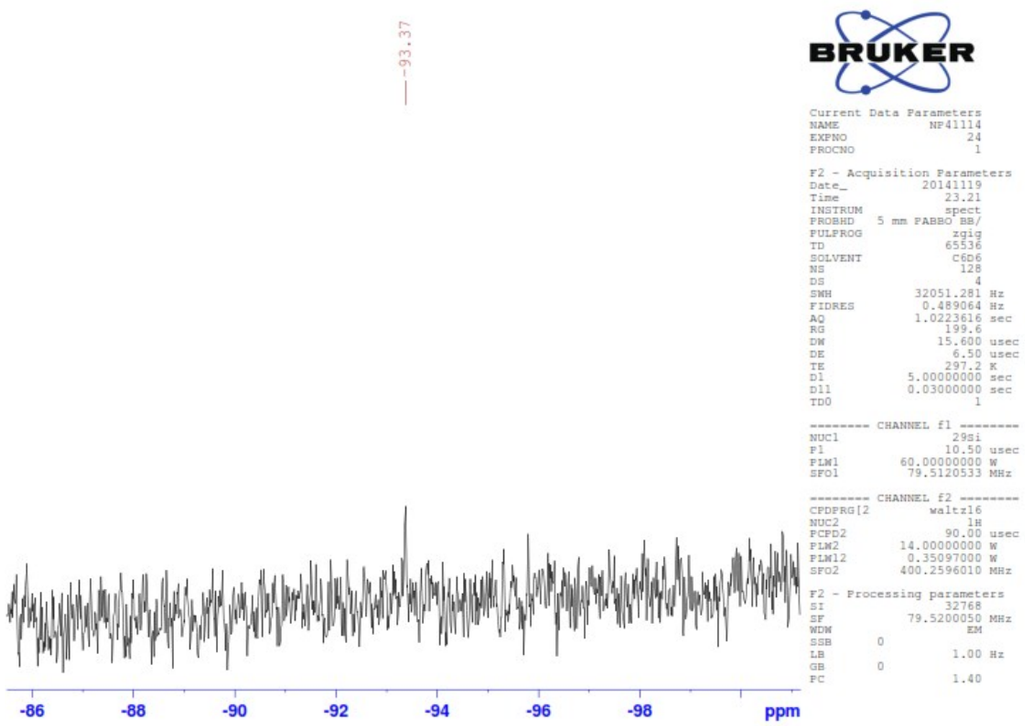


Figure S8. ^{29}Si NMR spectrum of [(^{t}Bu)$_2$Sn(OSi(O^{t}Bu)$_3$)Cl] (**2)** in C_6D_6.

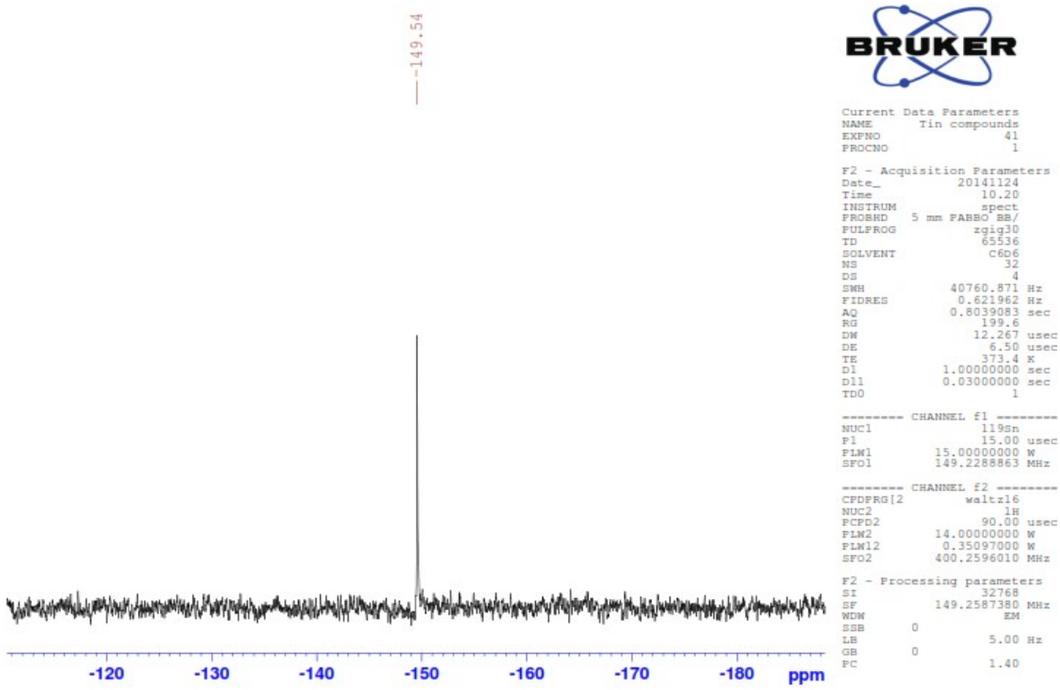


Figure S9.^{119}Sn NMR spectrum of [(^{t}Bu)$_2$Sn(OSi(O^{t}Bu)$_3$)Cl] (**2)** in C_6D_6.

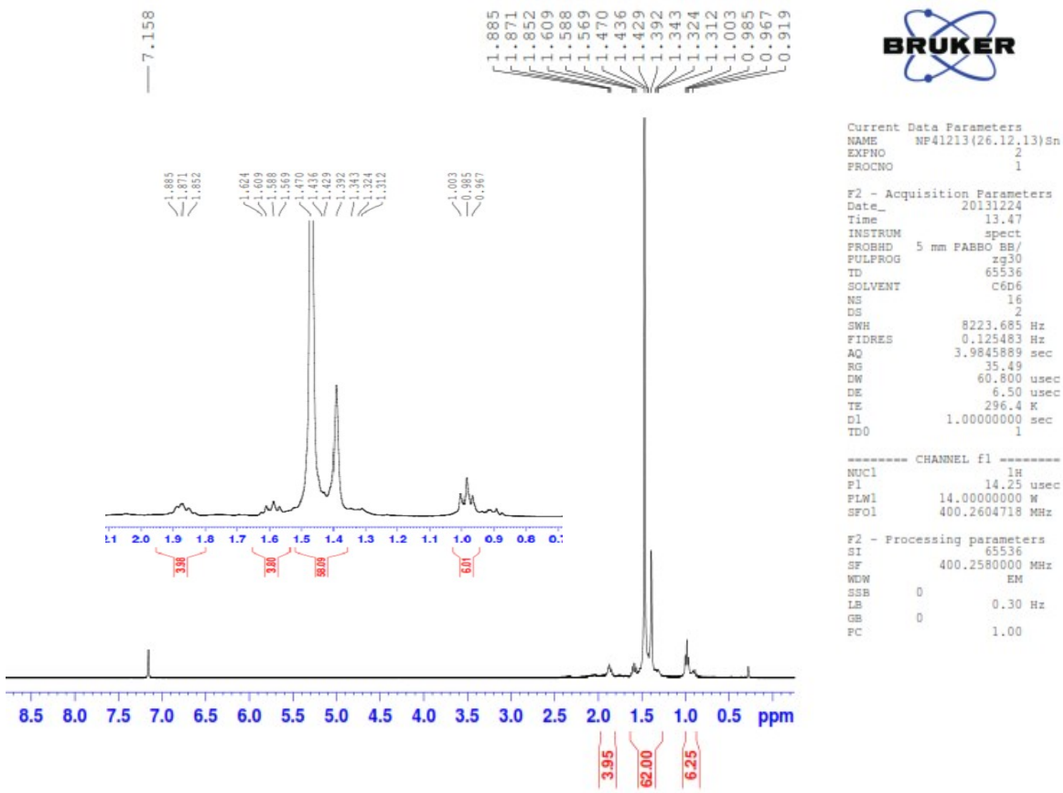


Figure S10. ^{1}H NMR spectrum of [(*n*-Bu)$_2$Sn(OSi(O^{t}Bu)$_3$)$_2$] (**3**) in C_6D_6.

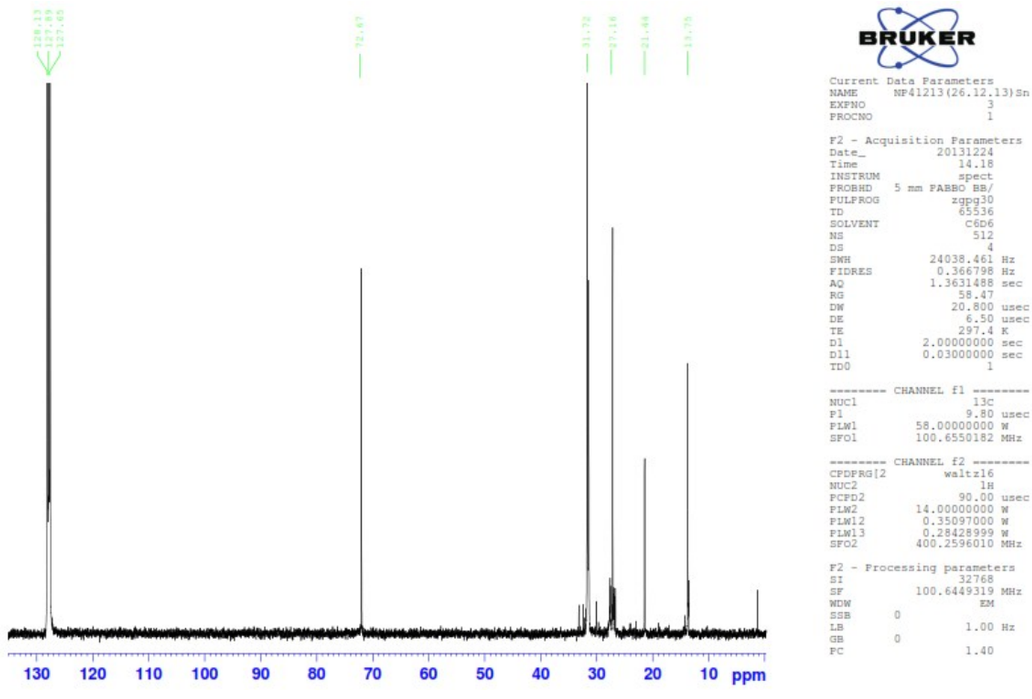


Figure S11. ^{13}C NMR spectrum of [(*n*-Bu)$_2$Sn(OSi(O^{t}Bu)$_3$)$_2$] (**3**) in C_6D_6.

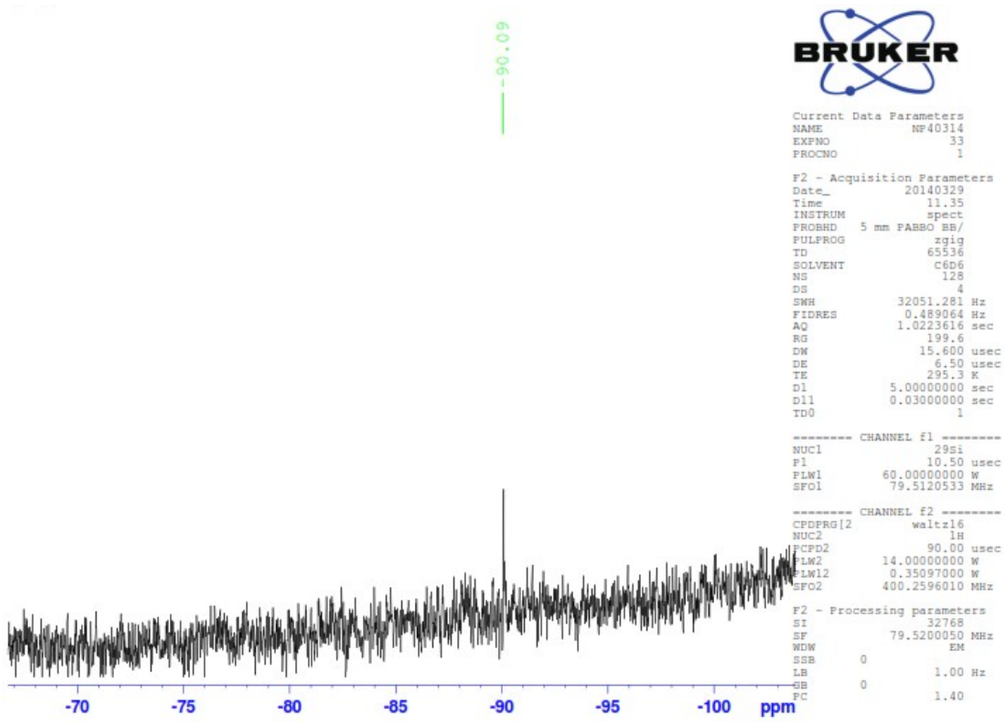


Figure S12. ^{29}Si NMR spectrum of [(*n*-Bu)$_2$Sn(OSi(O^{t}Bu)$_3$)$_2$] (**3**) in C_6D_6.

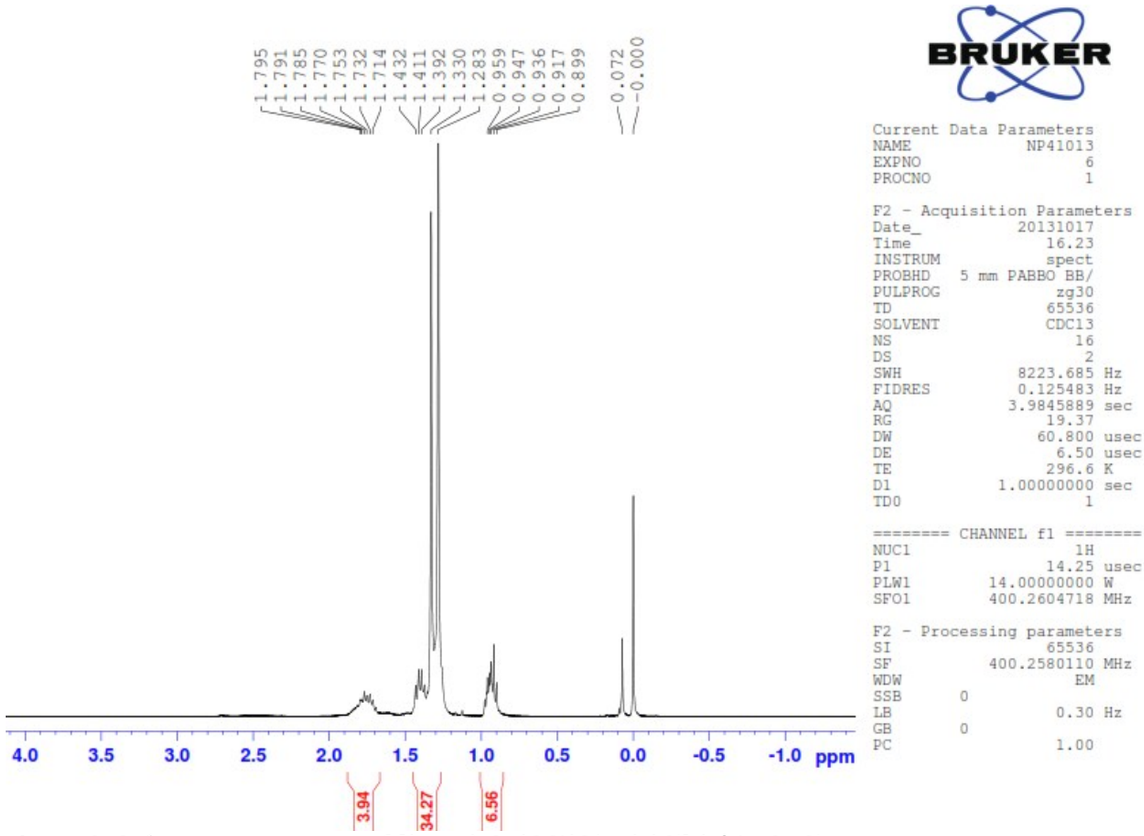
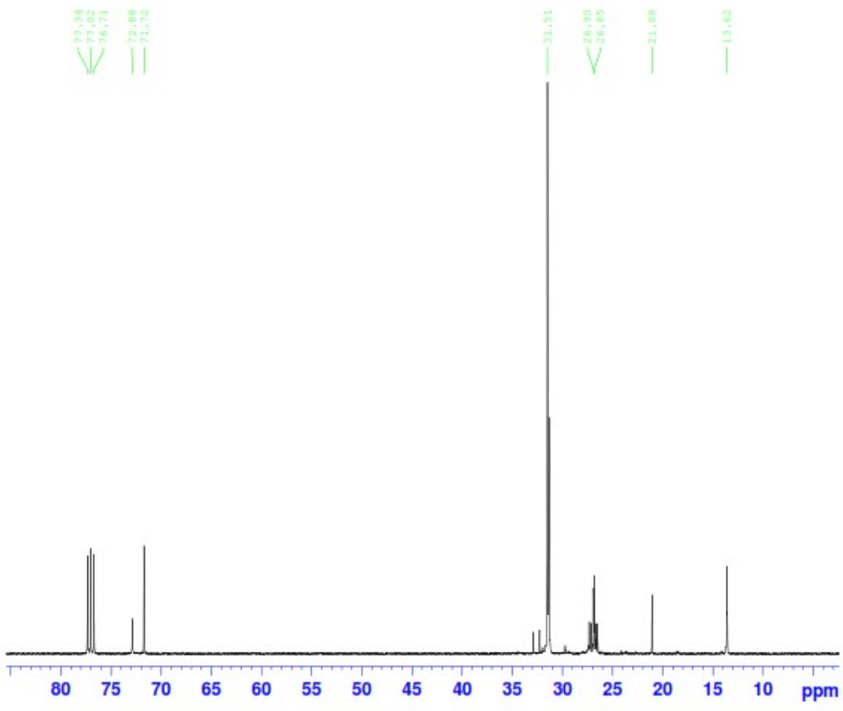


Figure S13. ^{1}H NMR spectrum of [(*n*-Bu)$_2$Sn(OSi(O^{t}Bu)$_3$)Cl] (**4**) in $CDCl_3$.

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RG                    156.91
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DE                     6.50 usec
TE                    297.2 K
D1                2.00000000 sec
D11               0.03000000 sec
TD0                         1

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P1                       9.80 usec
PLW1             58.00000000 W
SFO1            100.6550182 MHz

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NUC2                      1H
PCPD2                  90.00 usec
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PLW13             0.28428999 W
SFO2            400.2596010 MHz

F2 - Processing parameters
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PC                     1.40
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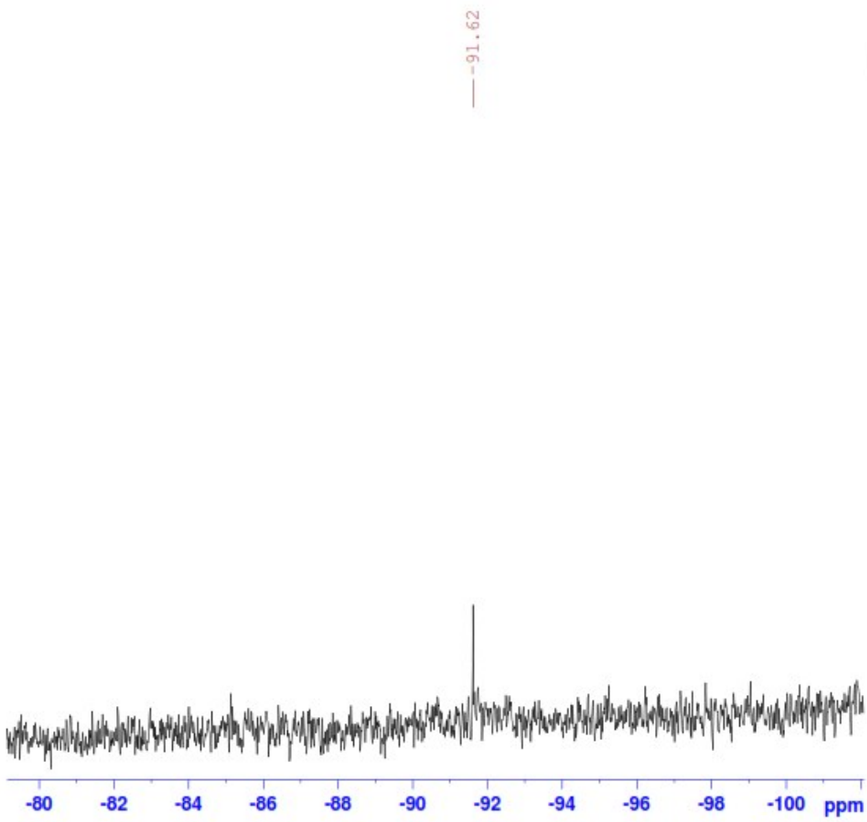
Figure S14. ^{13}C NMR spectrum of [(*n*-Bu)$_2$Sn(OSi(O^{t}Bu)$_3$Cl] (**4)** in $CDCl_3$.

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TE                    297.2 K
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TD0                         1

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PLW1             60.00000000 W
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SFO2            400.2596010 MHz

F2 - Processing parameters
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LB                     1.00 Hz
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Figure S15. ^{29}Si NMR spectrum of [(*n*-Bu)$_2$Sn(OSi(O^{t}Bu)$_3$Cl] (**4**) in C_6D_6.

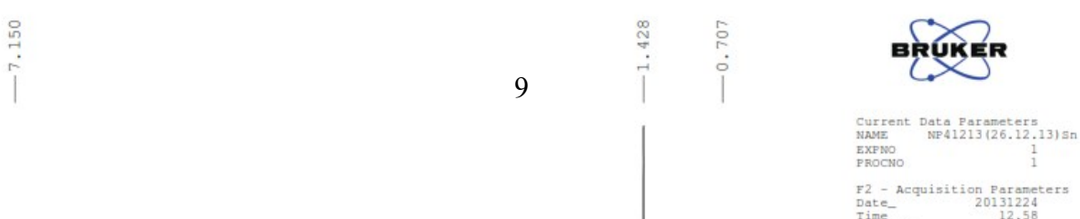


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Figure S16. ^{1}H NMR spectrum of [(Me)$_2$Sn(OSi(O^{t}Bu)$_3$)$_2$] (**5)** in C_6D_6.

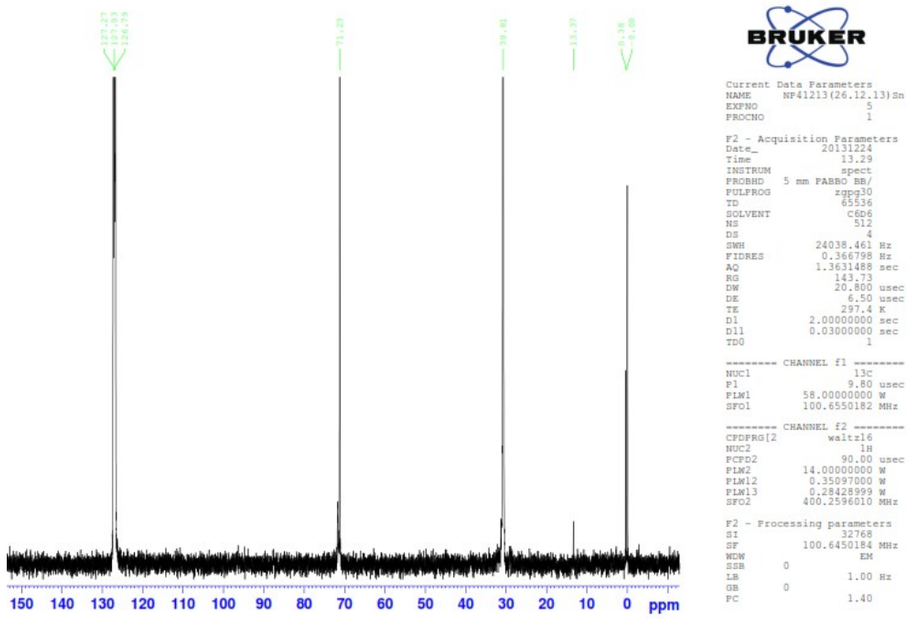


Figure S17. ^{13}C NMR spectrum of [(Me)$_2$Sn(OSi(O^{t}Bu)$_3$)$_2$] (**5)** in C_6D_6.

Figure S18. ^{29}Si NMR spectrum of [$(Me)_2Sn(OSi(O^tBu)_3)_2$] (**5)** in C_6D_6.

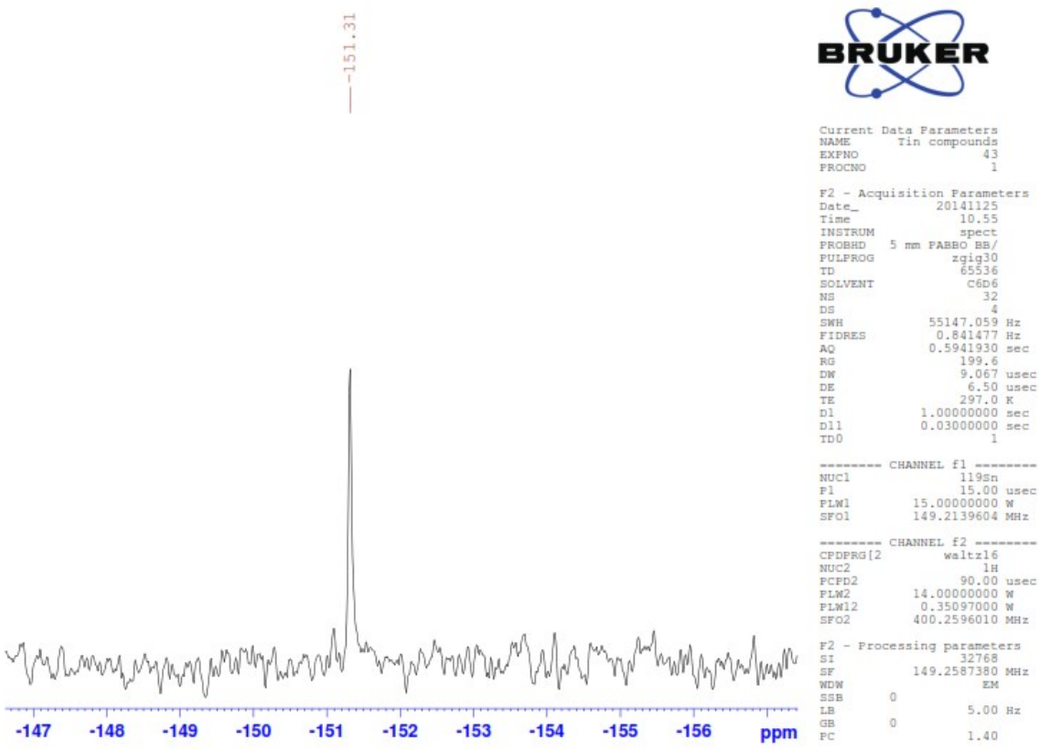
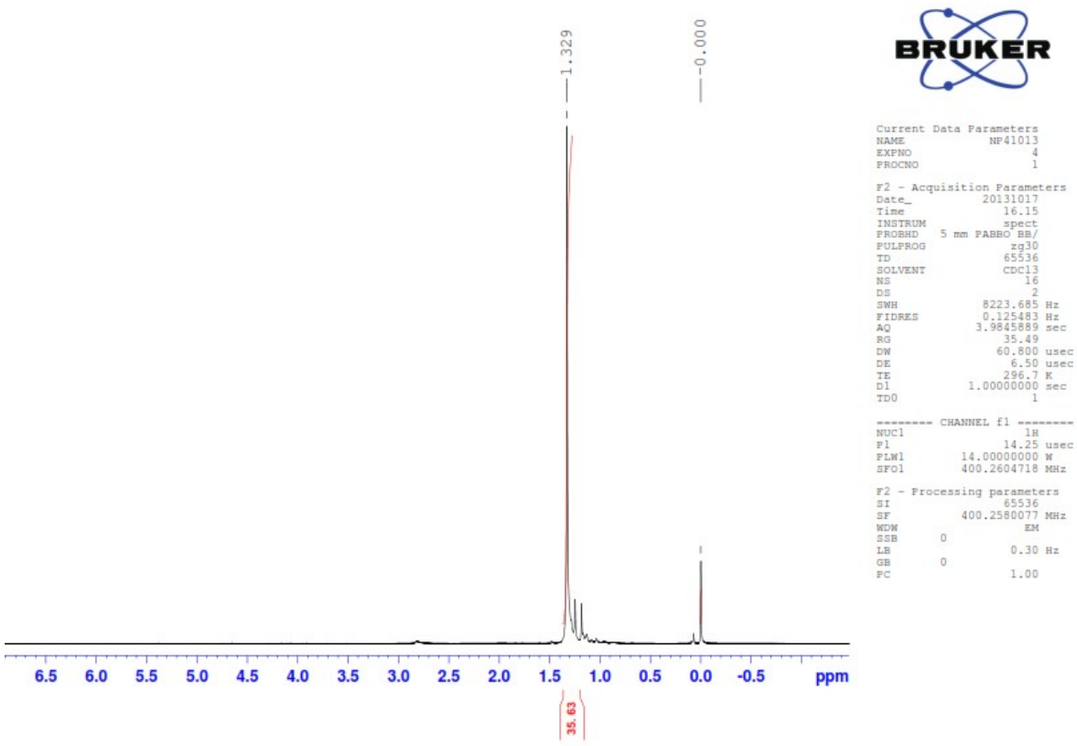


Figure S19. ^{119}Sn NMR spectrum of [$(Me)_2Sn(OSi(O^tBu)_3)_2$] (**5)** in C_6D_6.

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DS                        2
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FIDRES             0.125483 Hz
AQ                 3.9845889 sec
RG                     35.49
DW                    60.800 usec
DE                     6.50 usec
TE                    296.7 K
D1                 1.00000000 sec
TD0                       1

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P1                     14.25 usec
PLW1           14.00000000 W
SFO1           400.2604718 MHz

F2 - Processing parameters
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WDW                      EM
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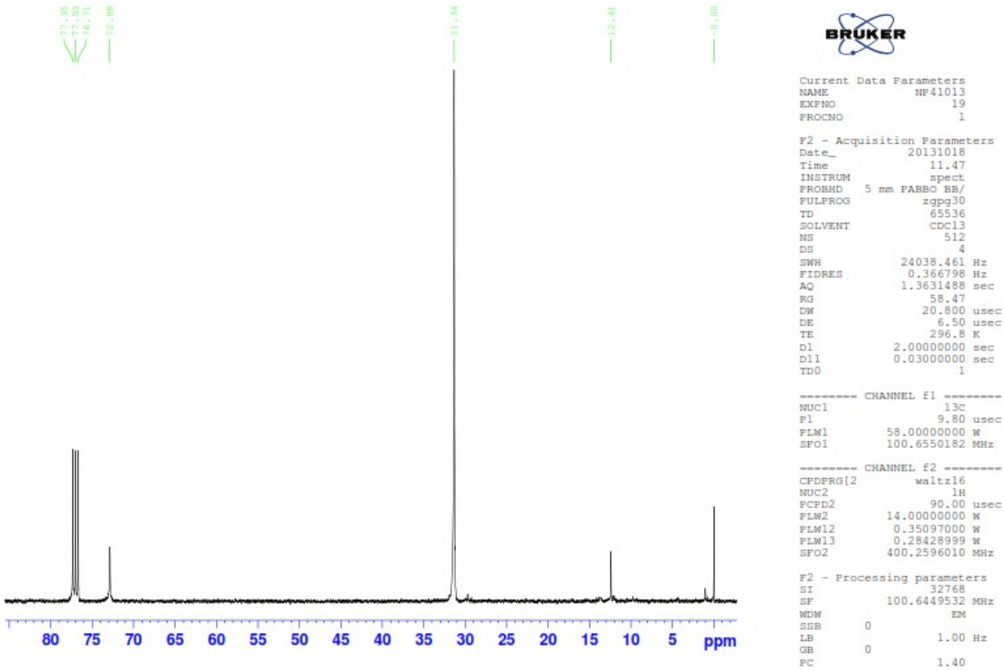
Figure S20. ^{1}H NMR spectrum of [(Me)$_2$Sn(OSi(O^{t}Bu)$_3$)Cl] (**6**) in CDCl$_3$.

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SOLVENT               CDCl3
NS                      512
DS                        4
SWH               24038.461 Hz
FIDRES             0.366798 Hz
AQ                 1.3631488 sec
RG                     58.47
DW                    20.800 usec
DE                     6.50 usec
TE                    296.8 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                       1

======== CHANNEL f1 ========
NUC1                     13C
P1                     9.80 usec
PLW1           58.00000000 W
SFO1           100.6550182 MHz

======== CHANNEL f2 ========
CPDPRG[2           waltz16
NUC2                      1H
PCPD2                 90.00 usec
PLW2           14.00000000 W
PLW12           0.35097000 W
PLW13           0.28428999 W
SFO2           400.2596010 MHz

F2 - Processing parameters
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WDW                      EM
SSB          0
LB                     1.00 Hz
GB           0
PC                     1.40
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Figure S21. ^{13}C NMR spectrum of [(Me)$_2$Sn(OSi(O^{t}Bu)$_3$)Cl] (**6**) in CDCl$_3$.

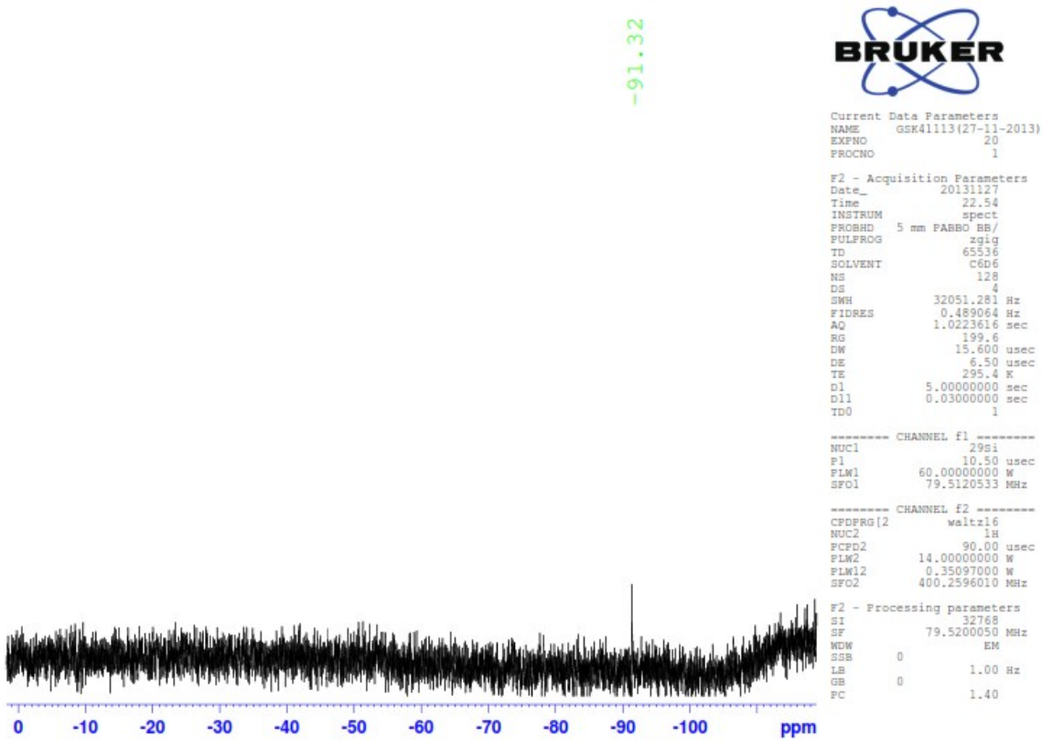

Figure S22. ^{29}Si NMR spectrum of [(Me)$_2$Sn(OSi(O^{t}Bu)$_3$)Cl] (**6**) in C_6D_6.

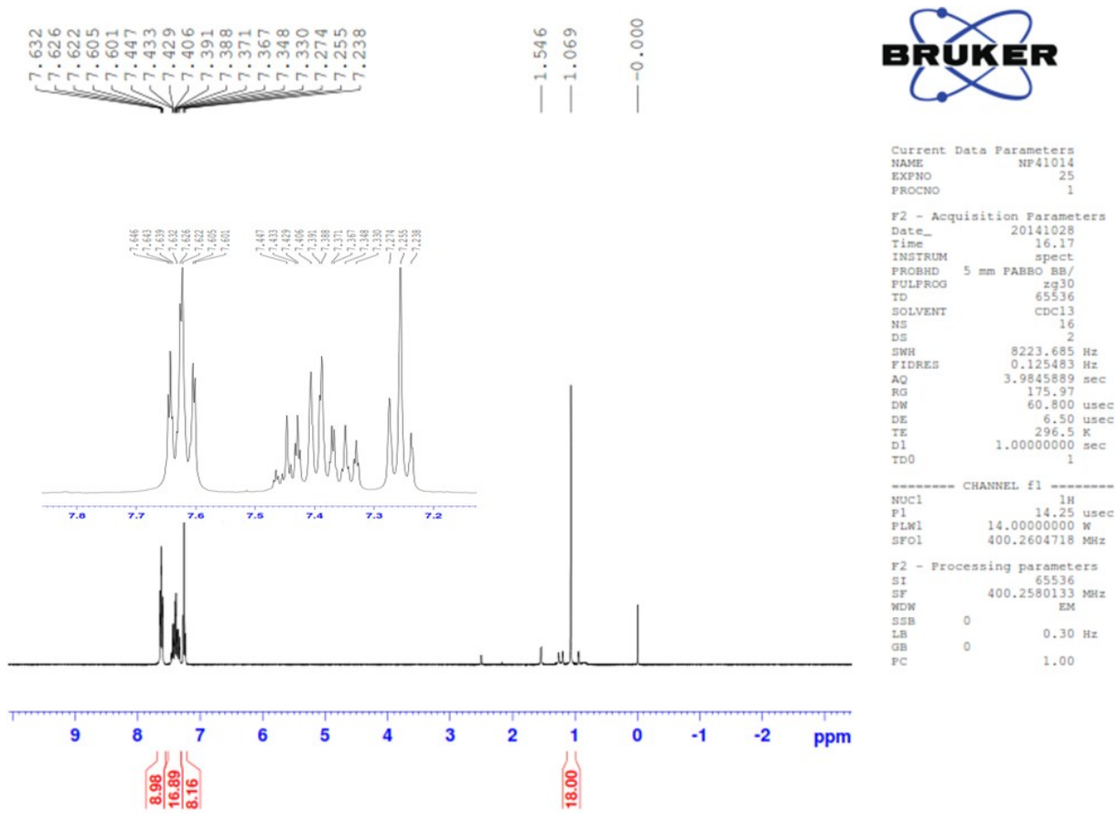

Figure S23. ^{1}H NMR spectrum of [(^{t}Bu)$_2$Sn(OSiPh$_3$)$_2$] (**7)** in $CDCl_3$.

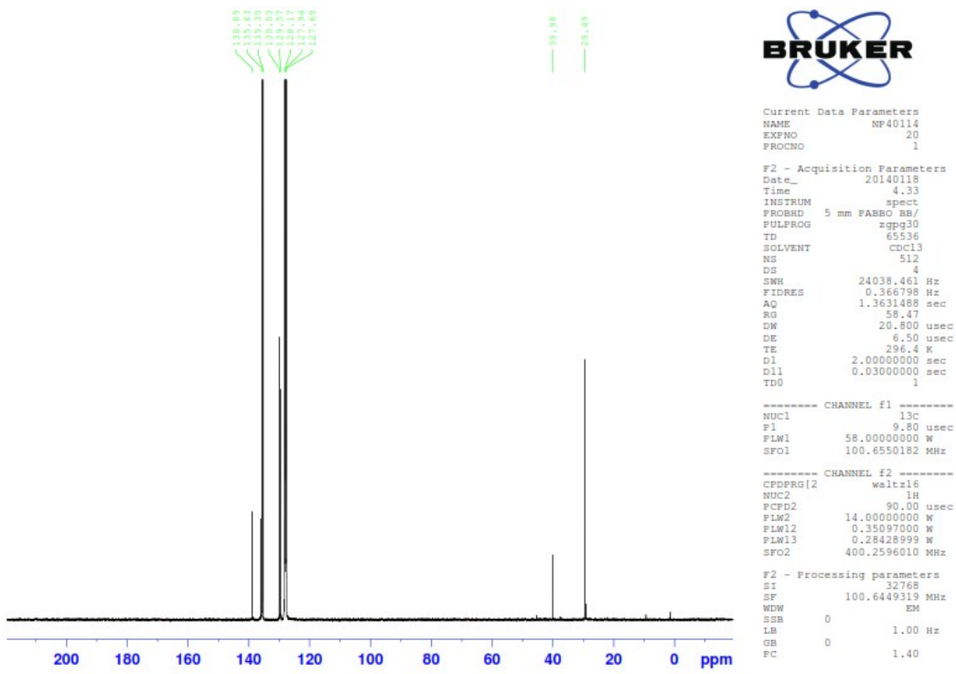

Figure S24. ^{13}C NMR spectrum of $[(^tBu)_2Sn(OSiPh_3)_2]$ (**7)** in $CDCl_3$.

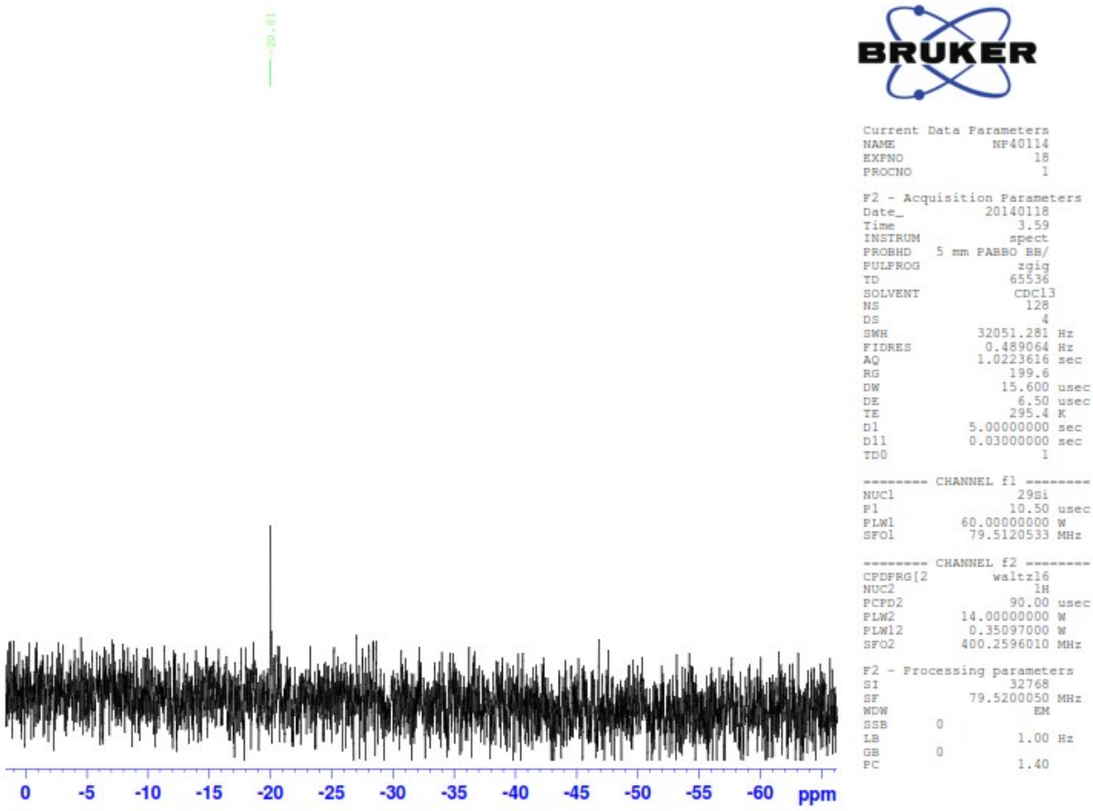

Figure S25. ^{29}Si NMR spectrum of $[(^tBu)_2Sn(OSiPh_3)_2]$ (**7)** in $CDCl_3$.

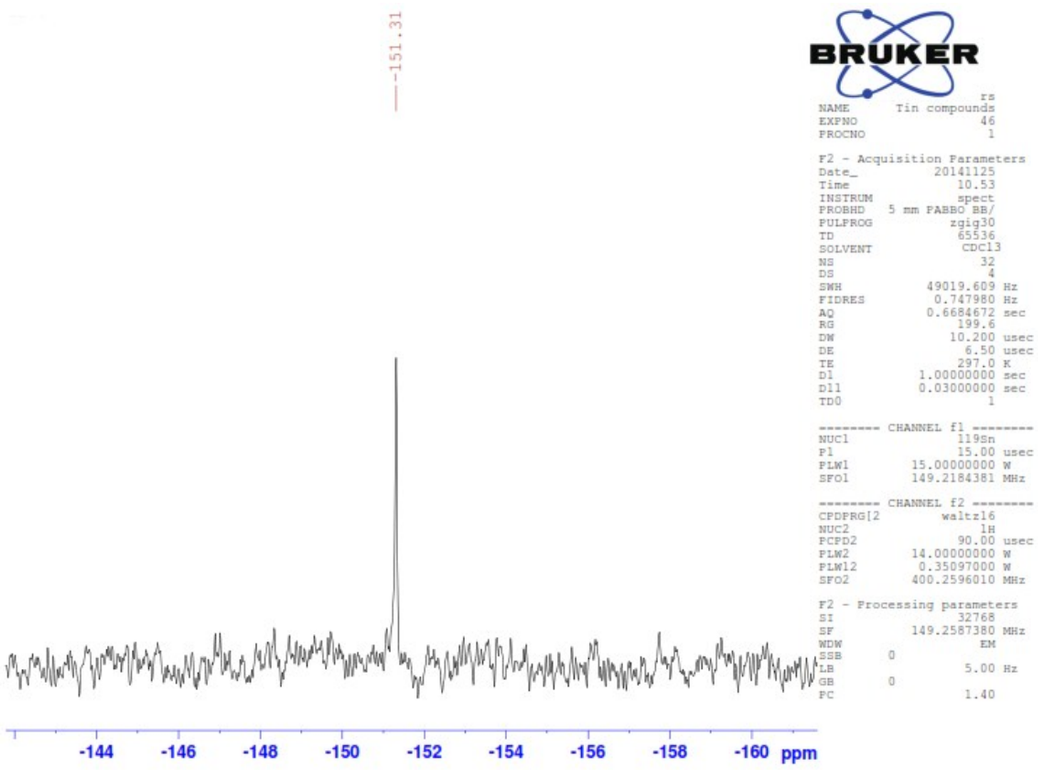

Figure S26. ^{119}Sn NMR spectrum of [(^{t}Bu)$_2$Sn(OSiPh$_3$)$_2$] (**7)** in CDCl$_3$.

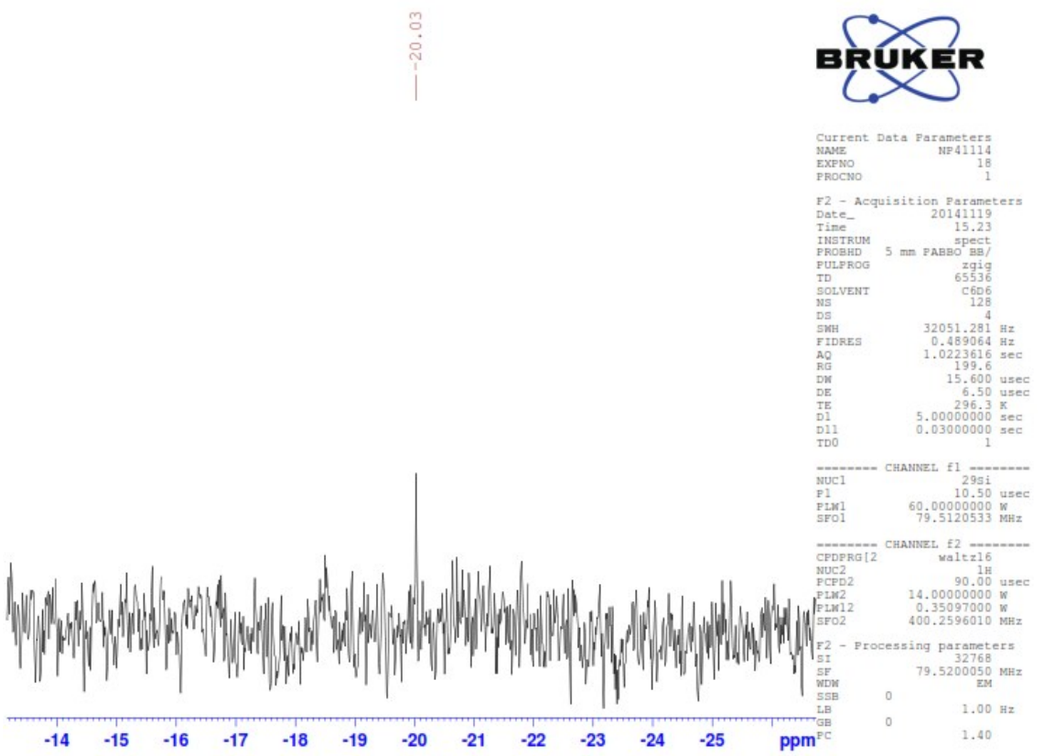

Figure S27. ^{29}Si NMR spectrum of [(^{t}Bu)$_2$Sn(OSiPh$_3$)Cl] (**8**) in C$_6$D$_6$.

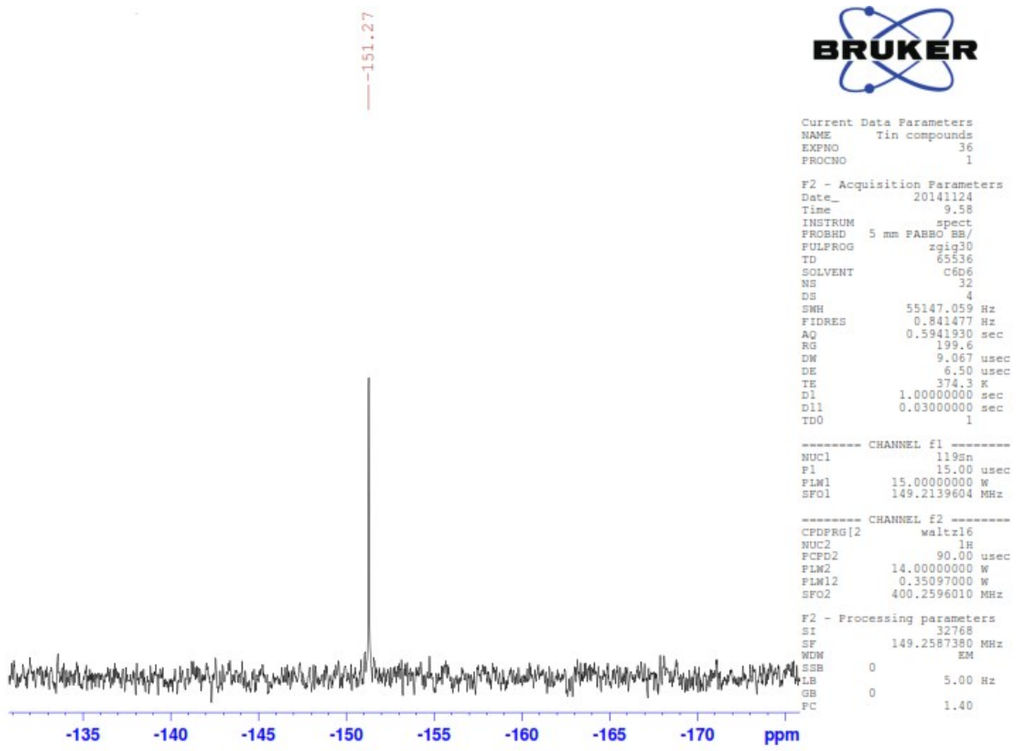

Figure S28. ^{119}Sn NMR spectrum of [(^{t}Bu)$_2$Sn(OSiPh$_3$)Cl] (**8**) in C_6D_6.

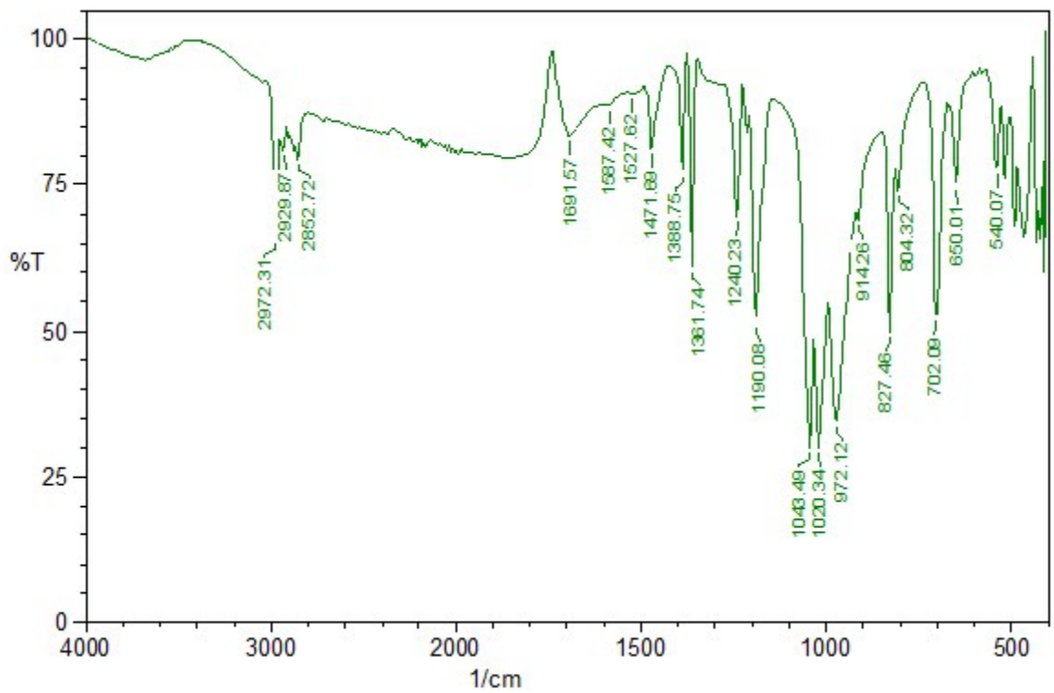

Figure S29. FT-IR spectrum of [(^{t}Bu)$_2$Sn(OSi(O^{t}Bu)$_3$)$_2$] (**1**).

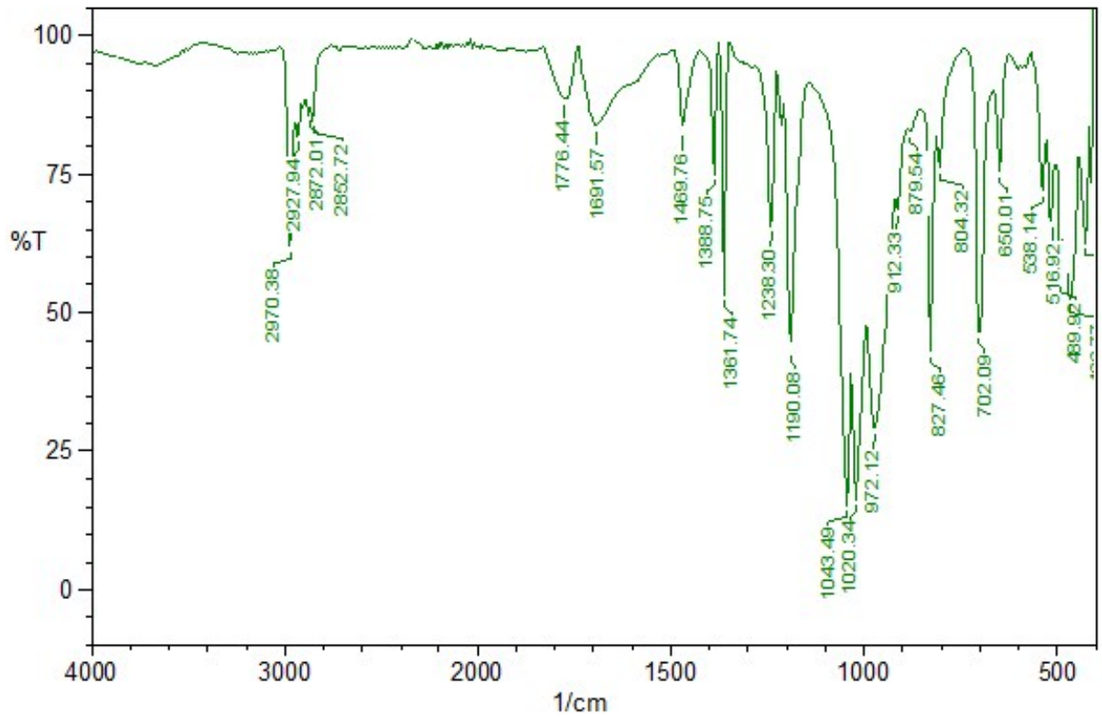

Figure S30. FT-IR spectrum of [(*n*-Bu)$_2$Sn(OSi(O^{t}Bu)$_3$)$_2$] (**3**)

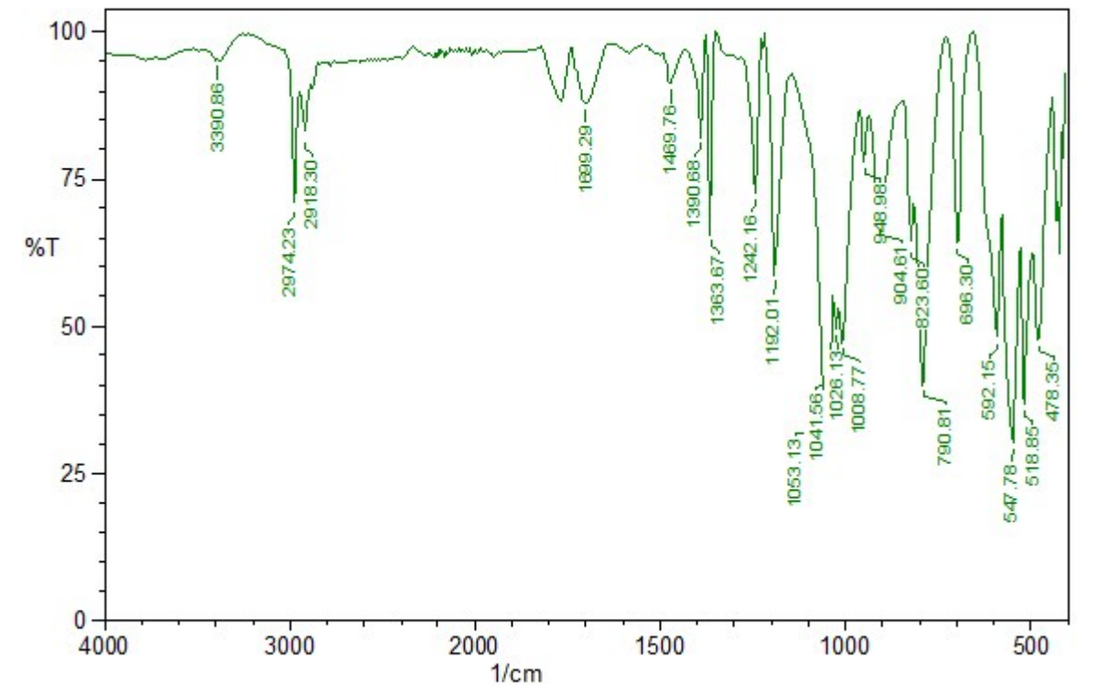

Figure S31. FT-IR spectrum of [(Me)$_2$Sn(OSi(O^{t}Bu)$_3$)$_2$] (**5**).

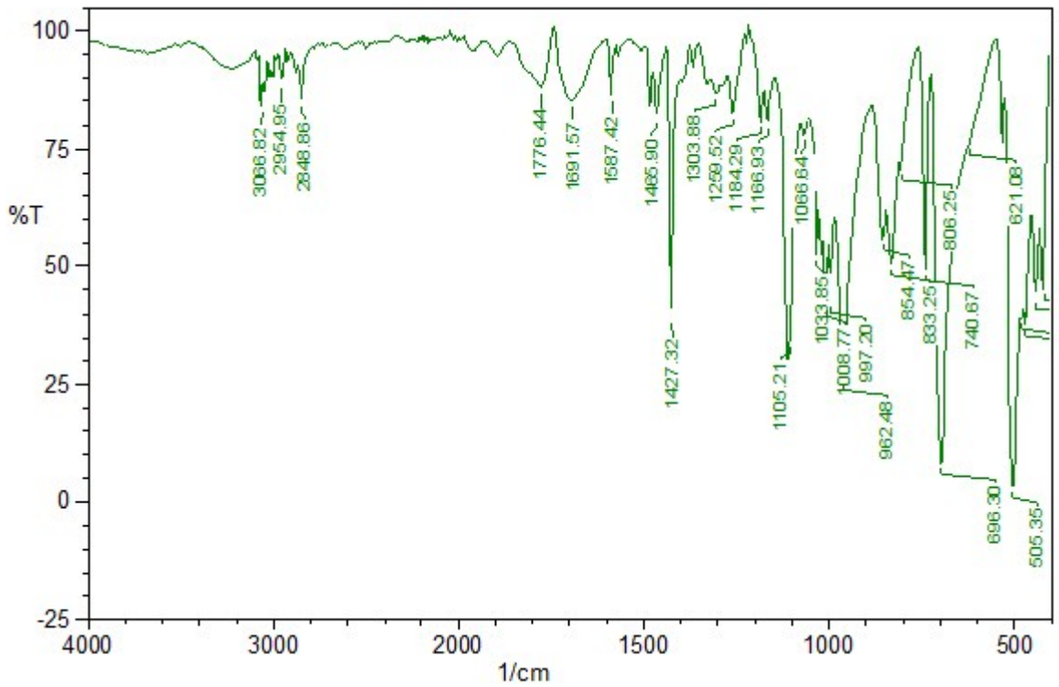

Figure S32. FT-IR spectrum of [(^{t}Bu)$_2$Sn(OSiPh$_3$)$_2$] (**7)**

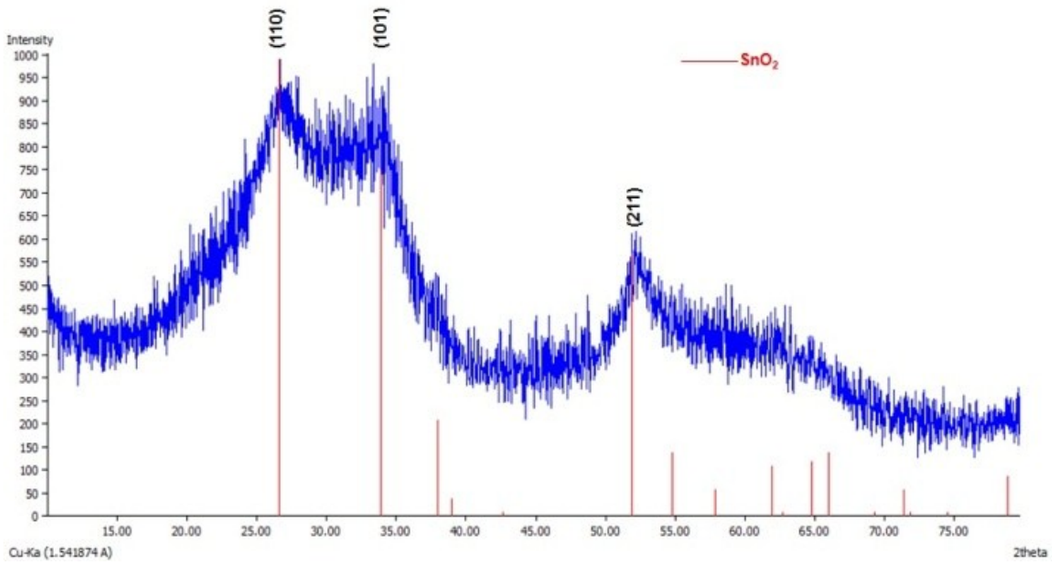

Figure S33. Powder XRD patterns of the tinsilicate material obtained from degradation of **1**.

References

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