Electronic Supplementary Material (ESI) for Dalton Transactions.


# Supporting Information:

Reaction of Stannylene Phosphorus Lewis Pairs with Dichlorides of Germanium, Tin and Lead – Formation of Base stabilized Stannyl Stannylenes/Germylenes and Redox Reaction with $PbCl_2$

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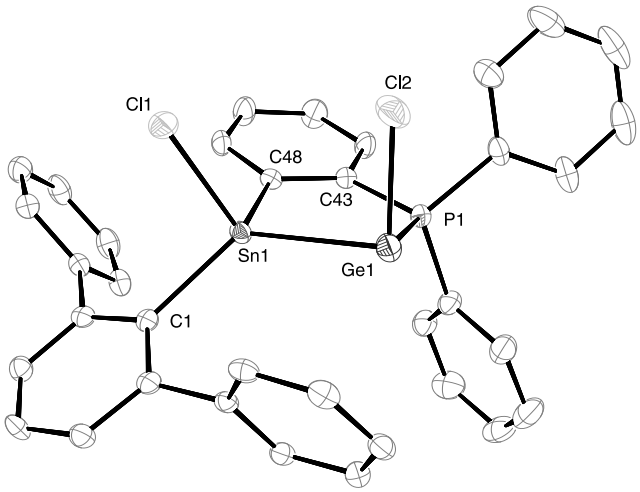
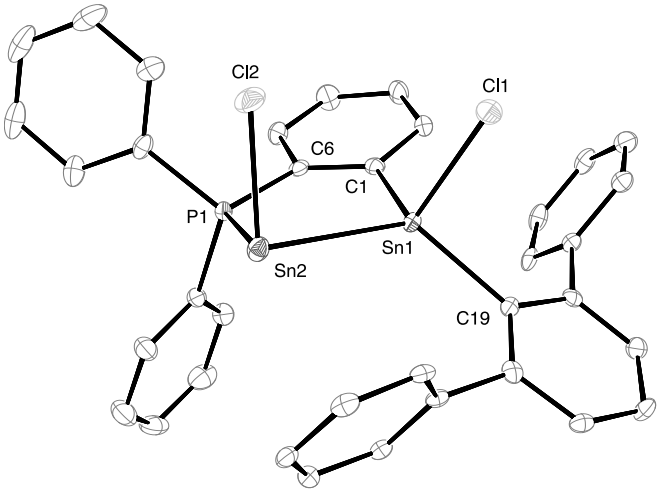
# 1 Crystallographic Details

## 1.1 Crystal structures of compounds 1-4

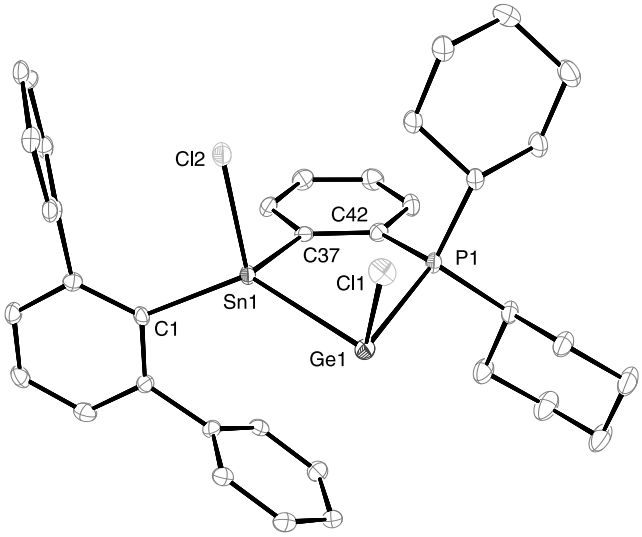
Hydrogen atoms and isopropyl moieties are omitted for clarity.



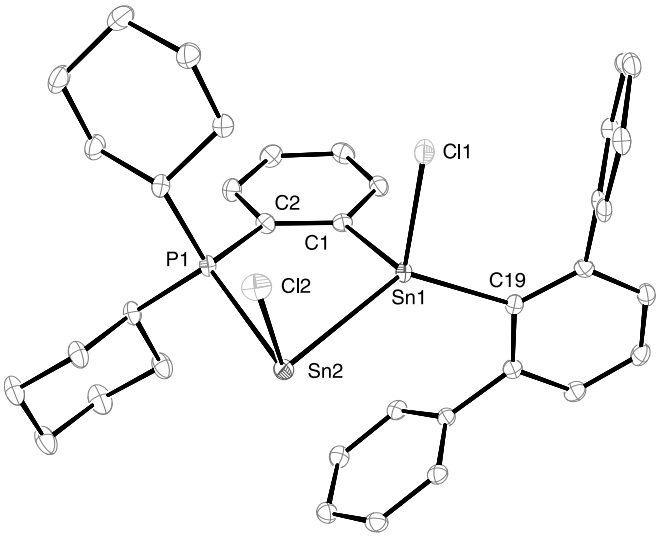

**1**




**2**




**3**




**4**

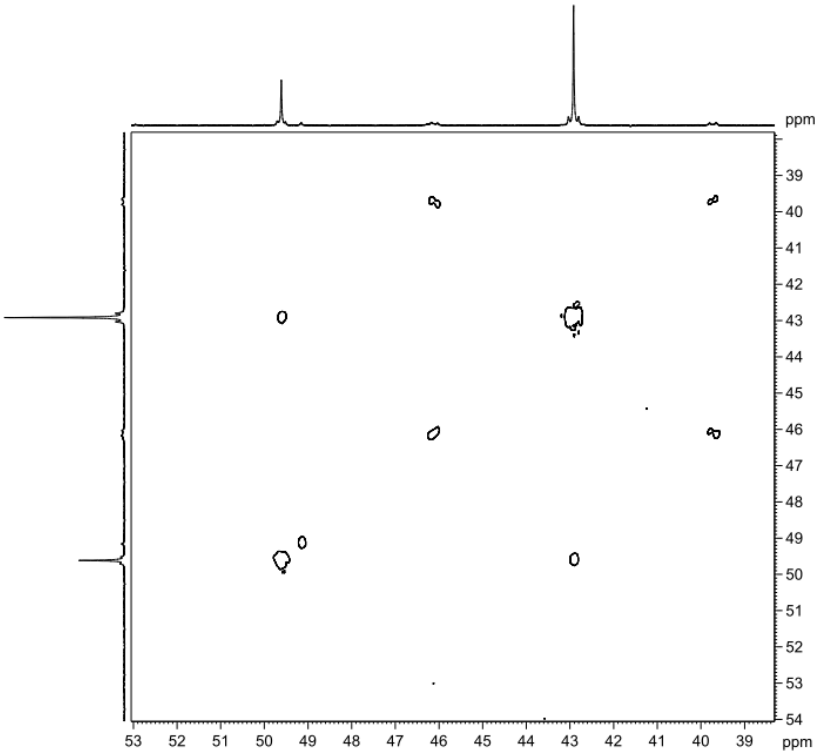
## 1.2 Crystal Structure Refinement Tables

**Table S1.** Crystal structure refinement table of compounds **1** - **5**.

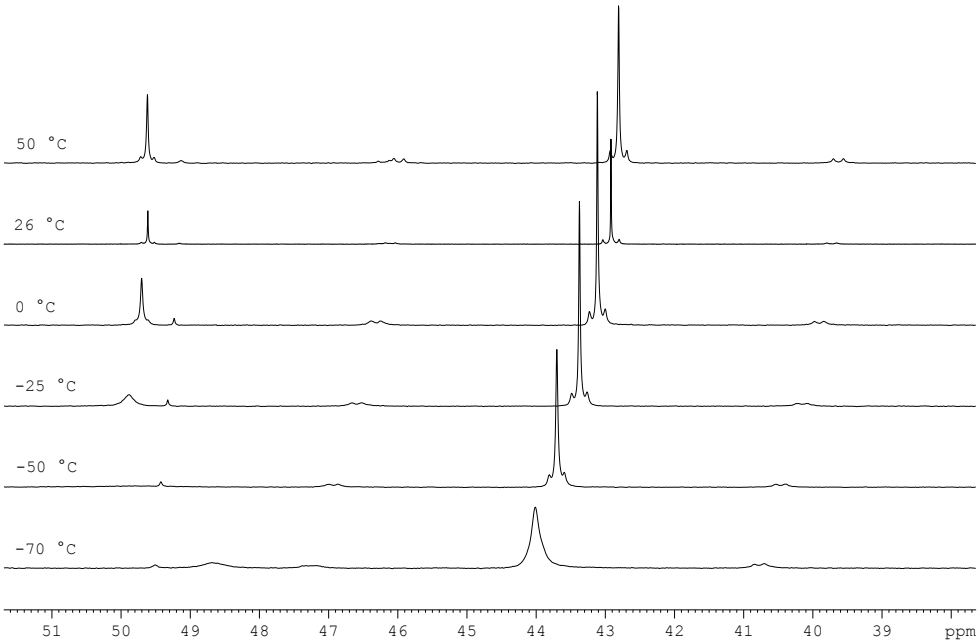
| | **1** × 2 eq toluene | **2** × 2 eq toluene | **3** | **4** | **5** × 1 eq hexane |
|---|---|---|---|---|---|
| Empirical formula | $C_{68}H_{80}Cl_2GePSn$ | $C_{68}H_{79}Cl_2PSn_2$ | $C_{54}H_{75}Cl_2GePSn$ | $C_{54}H_{75}Cl_2PSn_2$ | $C_{60}H_{75}Cl_2PSn$ |
| $M_r$ / g mol$^{-1}$ | 1190.47 | 1235.56 | 1017.29 | 1063.39 | 1016.76 |
| $\lambda$ / Å | 0.71073 | 0.71073 | 0.71073 | 0.71073 | 0.71073 |
| $T$ / K | 100(2) | 100(2) | 100(2) | 100(2) | 100(2) |
| Crystal system | orthorhombic | orthorhombic | orthorhombic | orthorhombic | orthorhombic |
| Space group | *Pna*2$_1$ | *Pna*2$_1$ | *Pbca* | *Pbca* | *Pbca* |
| Z | 4 | 4 | 8 | 8 | 8 |
| $a$ / Å | 29.0011(11) | 29.1761(10) | 16.0516(4) | 16.0688(4) | 14.7617(3) |
| $b$ / Å | 19.7482(7) | 19.7911(7) | 24.7557(6) | 24.6470(6) | 24.9093(5) |
| $c$ / Å | 10.5468(4) | 10.5653(3) | 25.9550(7) | 26.0868(6) | 29.0690(6) |
| $\alpha$ / ° | 90.00 | 90.00 | 90.00 | 90.00 | 90.00 |
| $\beta$ / ° | 90.00 | 90.00 | 90.00 | 90.00 | 90.00 |
| $\gamma$ / ° | 90.00 | 90.00 | 90.00 | 90.00 | 90.00 |
| $V$ / Å$^3$ | 6040.4(4) | 6100.7(3) | 10313.7(5) | 10331.6(4) | 10688.8(4) |
| $D_c$ / g cm$^{-3}$ | 1.309 | 1.345 | 1.310 | 1.367 | 1.264 |
| $\mu$ / mm$^{-1}$ | 1.065 | 0.972 | 1.235 | 1.135 | 0.645 |
| F(000) | 2476 | 2544 | 4240 | 4384 | 4272 |
| Crystal size / mm | 0.33 × 0.29 × 0.12 | 0.34 × 0.28 × 0.17 | 0.23 × 0.13 × 0.12 | 0.37 × 0.19 × 0.18 | 0.25 × 0.21 × 0.16 |
| $\theta$ range / ° | 2.06 - 28.33 | 2.19 - 28.30 | 2.60 - 28.11 | 2.60 - 28.28 | 2.56 - 28.26 |
| Limiting indices | -38 ≤ $h$ ≤ 38 | -37 ≤ $h$ ≤ 38 | -19 ≤ $h$ ≤ 19 | -19 ≤ $h$ ≤ 20 | -15 ≤ $h$ ≤ 19 |
| | -25 ≤ $k$ ≤ 26 | -26 ≤ $k$ ≤ 23 | -30 ≤ $k$ ≤ 30 | -29 ≤ $k$ ≤ 30 | -33 ≤ $k$ ≤ 33 |
| | -14 ≤ $l$ ≤ 13 | -14 ≤ $l$ ≤ 14 | -32 ≤ $l$ ≤ 32 | -32 ≤ $l$ ≤ 32 | -37 ≤ $l$ ≤ 38 |
| Reflects. collect. | 82847 | 64733 | 74213 | 158517 | 91447 |
| Indepdnt Reflects | 14658 | 14893 | 10523 | 10546 | 13265 |
| $R_{int}$ | 0.0286 | 0.0306 | 0.0481 | 0.0396 | 0.0326 |
| Completeness | 99.8 | 99.9 | 99.8 | 99.9 | 1.00 |
| Absorp. Corr. | numerical | numerical | numerical | numerical | numerical |
| Trans.(max., min.) | 0.88, 1.00 | 0.88, 1.00 | 0.90, 1.00 | 0.80, 0.93 | 0.94, 1.00 |
| Parameters/restraints | 693/1 | 702/43 | 544/0 | 544(0 | 590/39 |
| $R_1$, $\omega R_2$ [$I > 2\sigma(I)$] | 0.0276, 0.0623 | 0.0257, 0.0485 | 0.0308, 0.0606 | 0.0226, 0.0454 | 0.0360, 0.0782 |
| $R_1$, $\omega R_2$ (all data) | 0.0304, 0.0633 | 0.0294, 0.0494 | 0.0496, 0.0663 | 0.0300, 0.0481 | 0.0520, 0.0858 |
| GooF on $F^2$ | 1.072 | 1.111 | 1.042 | 1.047 | 1.033 |
| $\Delta\rho_{max,min}$ / e·Å$^{-3}$ | 0.986, -0.811 | 0.750, -0.528 | 0.642, -0.395 | 0.608, -0.431 | 1.431, -1.154 |
| Flack parameter | 0.011(6) | -0.004(9) | | | |
| CCDC | 1457389 | 1457390 | 1457387 | 1457388 | 1457391 |

# 2 Additional NMR Data

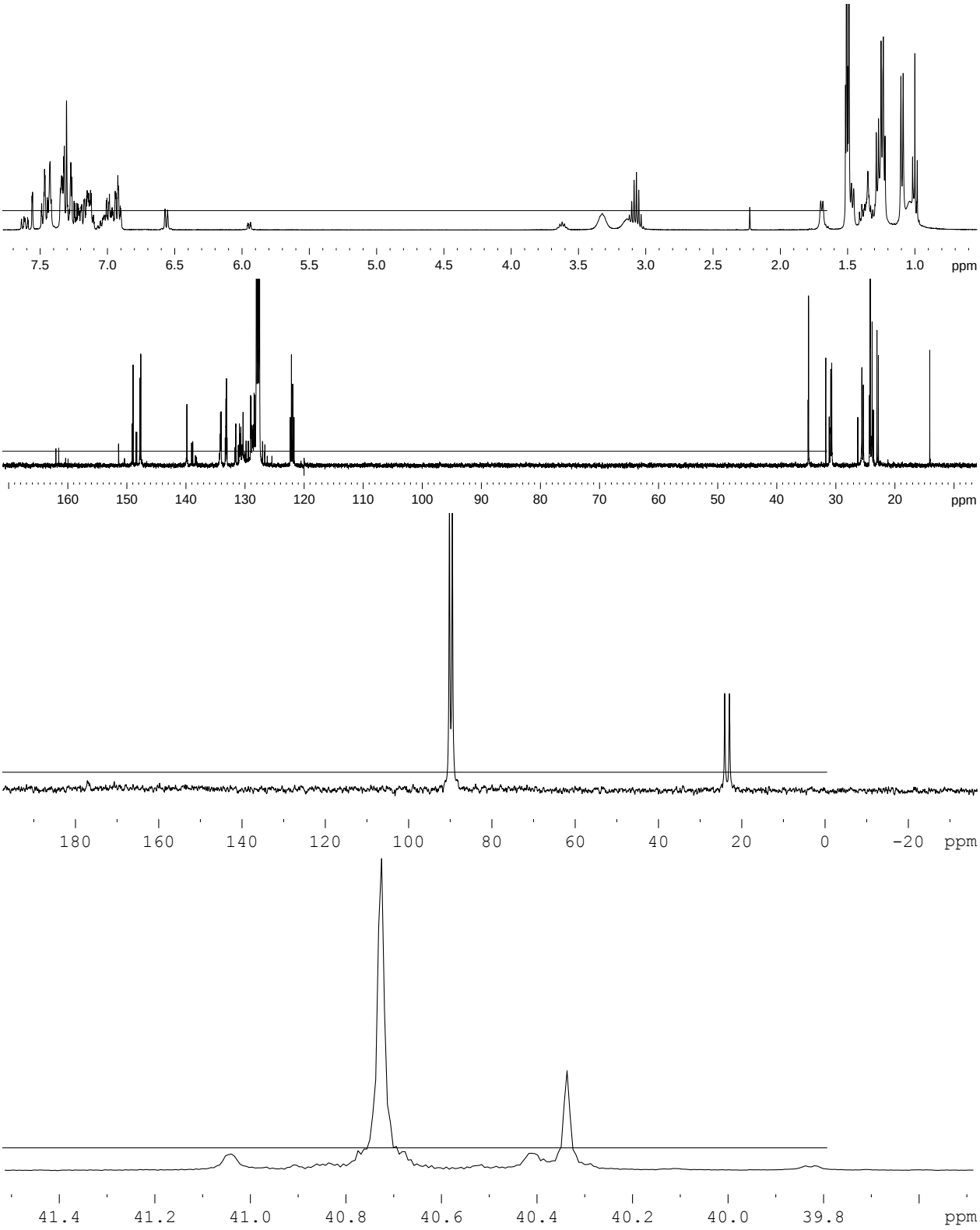
## 2.1 $^{31}P$-$^{31}P$ EXSY NMR spectrum for compound **4** (Tol-d8)



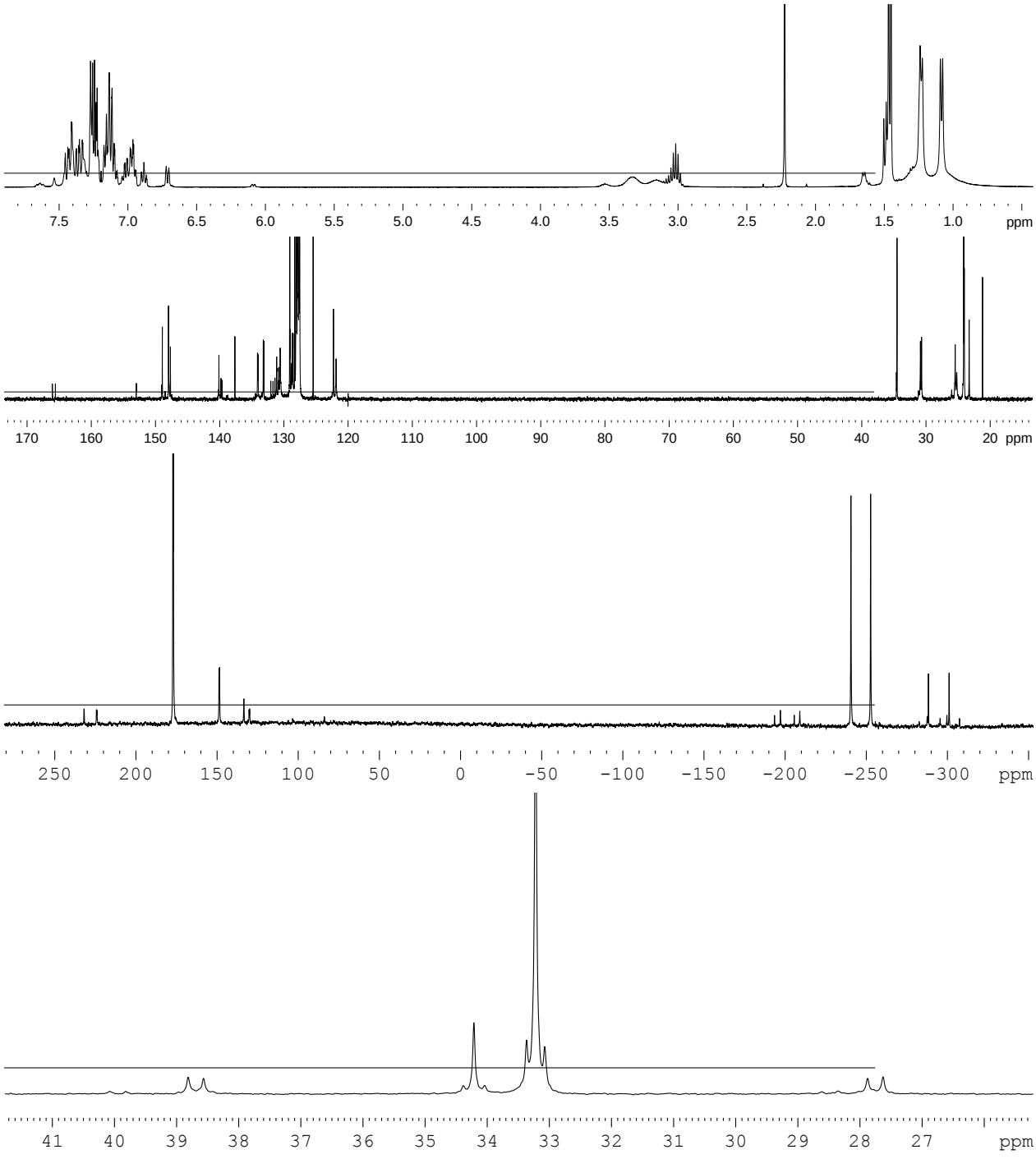

## 2.2 dT $^{31}P$ NMR spectra for compound **4** (Tol-d8)



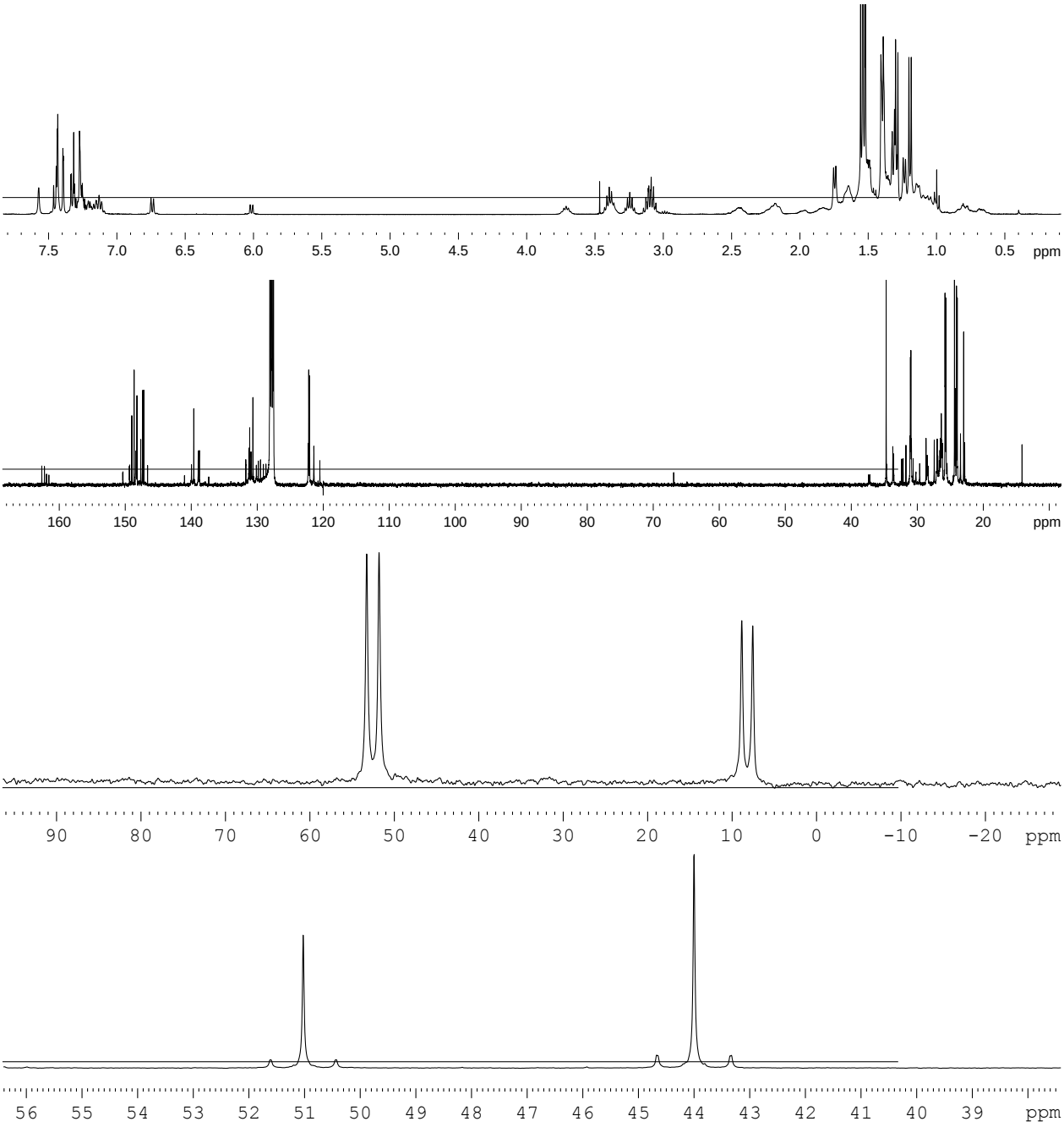
## 2.3 $^{1}H$, $^{13}C$, $^{119}Sn$ and $^{31}P$ NMR spectra for compound **1** ($C_6D_6$)



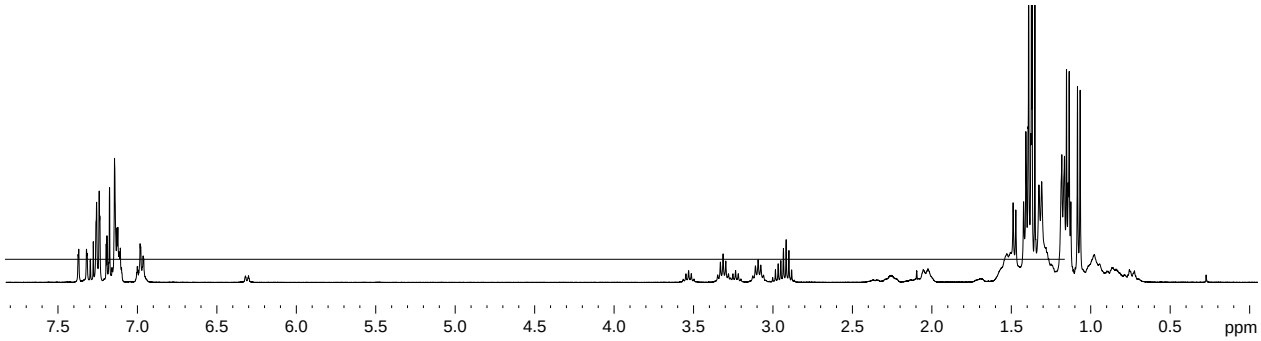
## 2.4 $^{1}H$, $^{13}C$, $^{119}Sn$ and $^{31}P$ NMR spectra for compound **2** ($C_6D_6$)

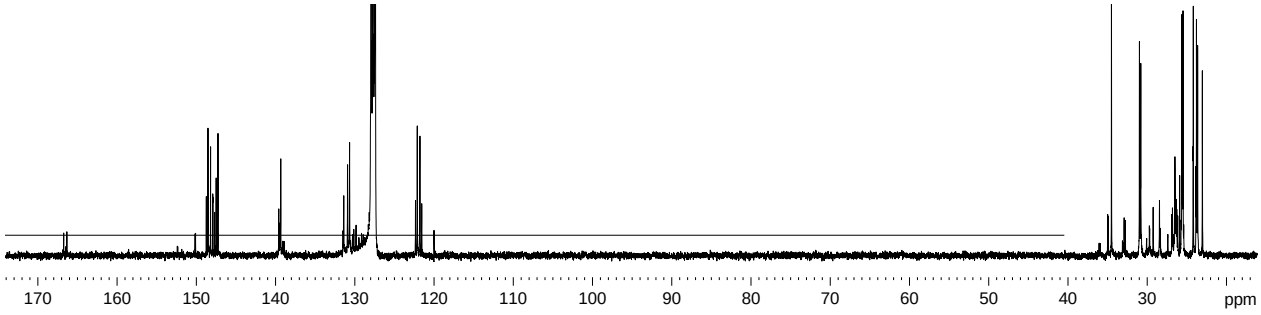


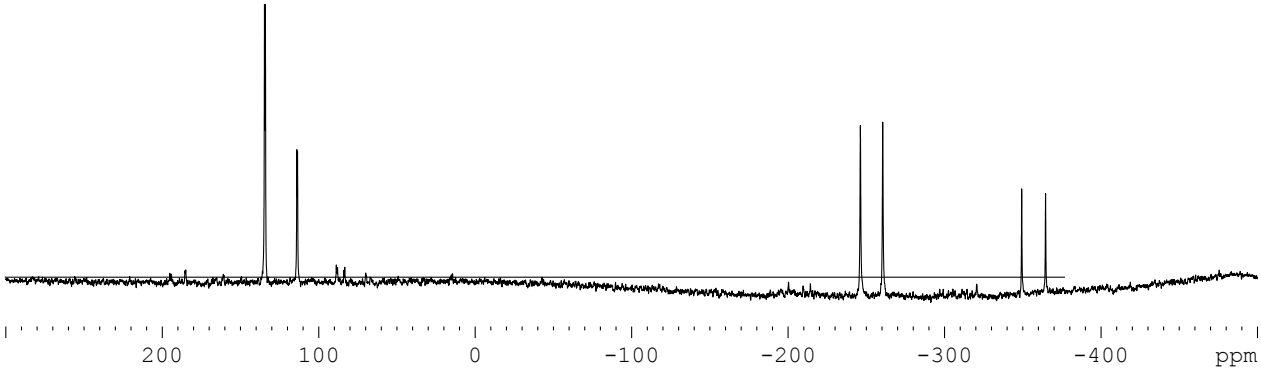
## 2.5 $^{1}H$, $^{13}C$, $^{119}Sn$ and $^{31}P$ NMR spectra for compound **3** ($C_6D_6$)

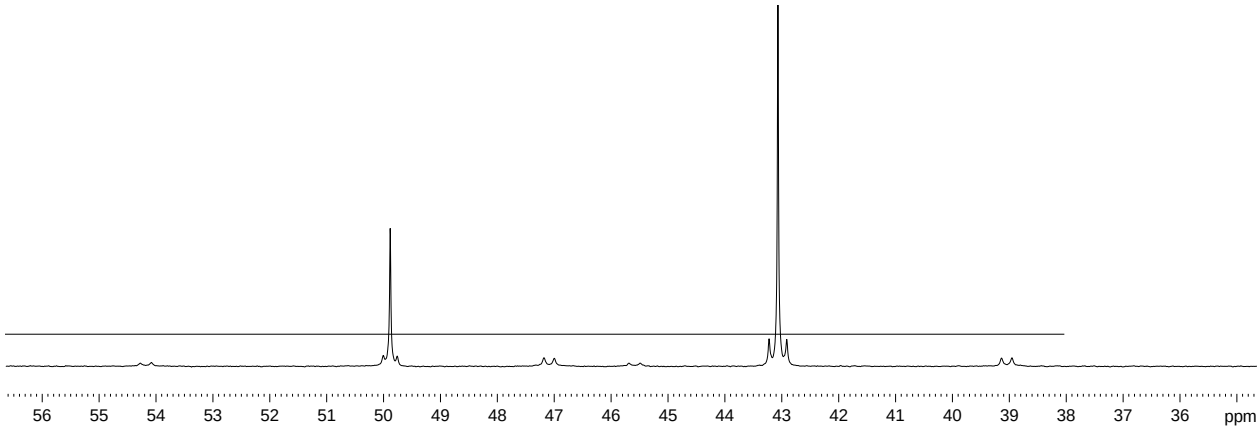


## 2.6 $^{1}H$, $^{13}C$, $^{119}Sn$ and $^{31}P$ NMR spectra for compound **4** ($C_6D_6$)

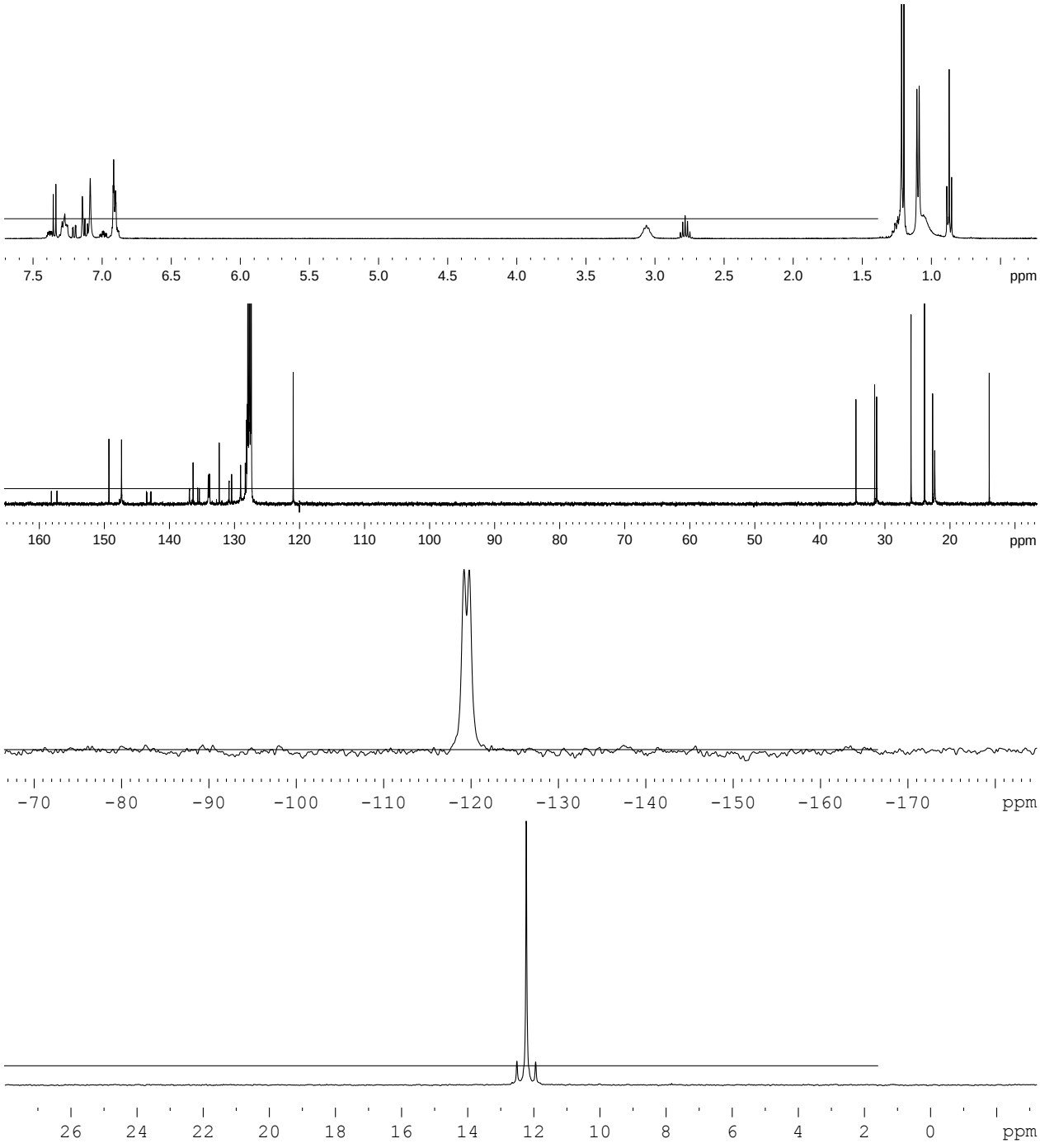


## 2.7 $^{1}H$, $^{13}C$, $^{119}Sn$ and $^{31}P$ NMR spectra for compound **5** ($C_6D_6$)



2.8 Examplary determination of the coupling pattern in the $^{119}$Sn NMR spectra (compound **2**):