

Supplementary Information

Selective Synthesis of (*Z*)-Chalcogenoenynes and (*Z,Z*)-1,4-bis-Chalcogenbuta-1,3-dienes Using PEG-400

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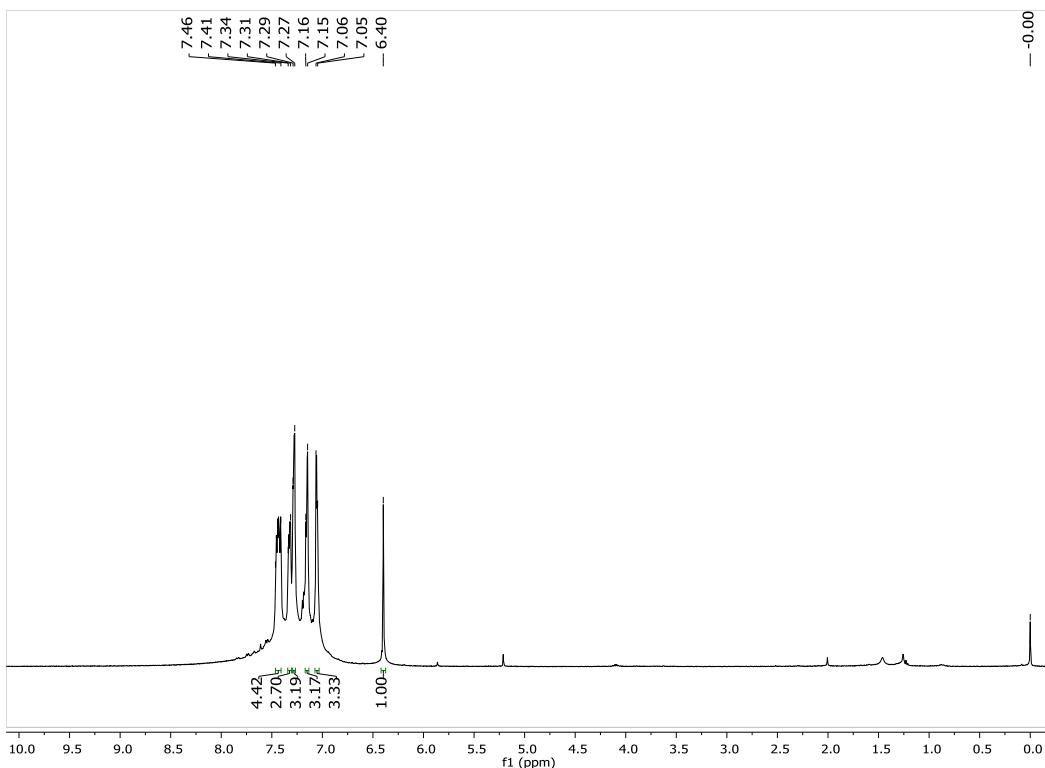


Figure S1. ¹H NMR (400 MHz, CDCl₃) spectrum of (*Z*)-1-phenylselanyl-1,4-diphenylbut-1-en-3-yne (**3a**).

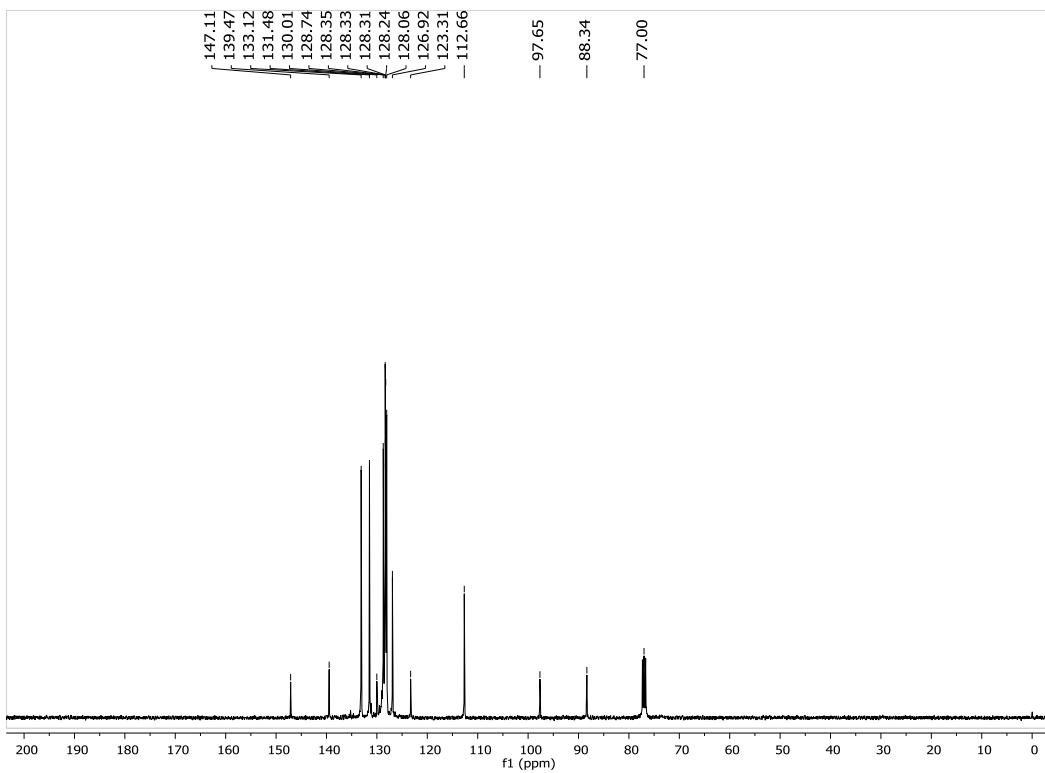


Figure S2. ¹³C NMR (100 MHz, CDCl₃) spectrum of (Z)-1-phenylselanyl-1,4-diphenylbut-1-en-3-yne (**3a**).

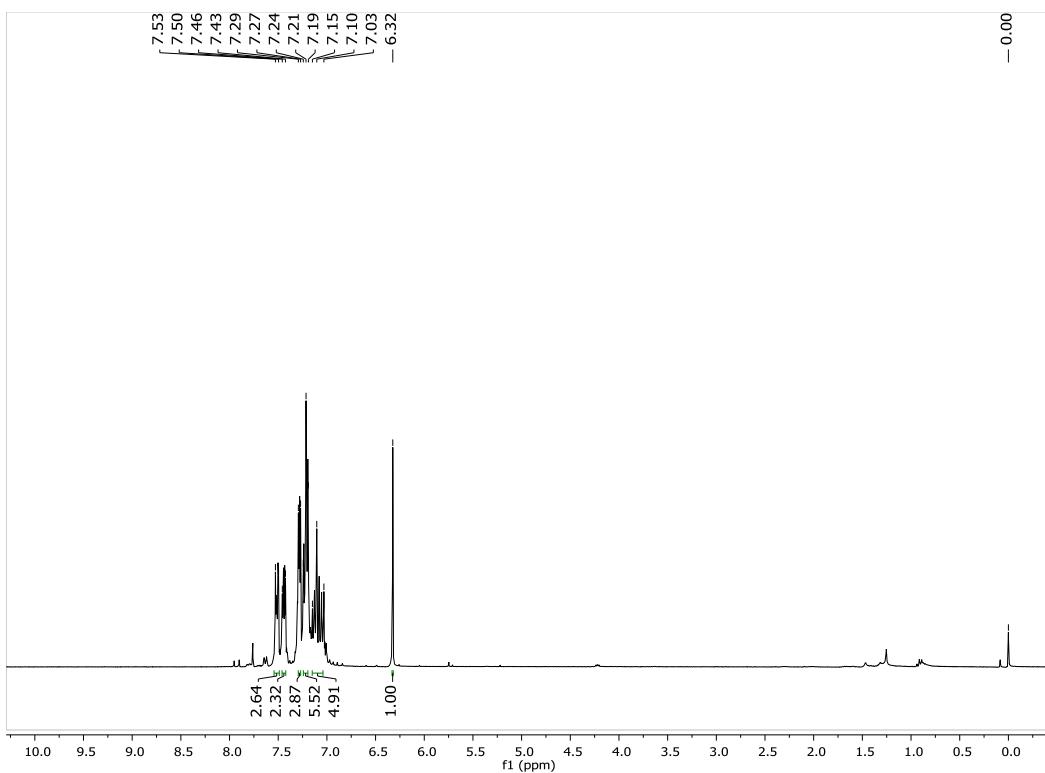


Figure S3. ¹H NMR (300 MHz, CDCl₃) spectrum of (Z)-1-phenylthio-1,4-diphenylbut-1-en-3-yne (**3b**).

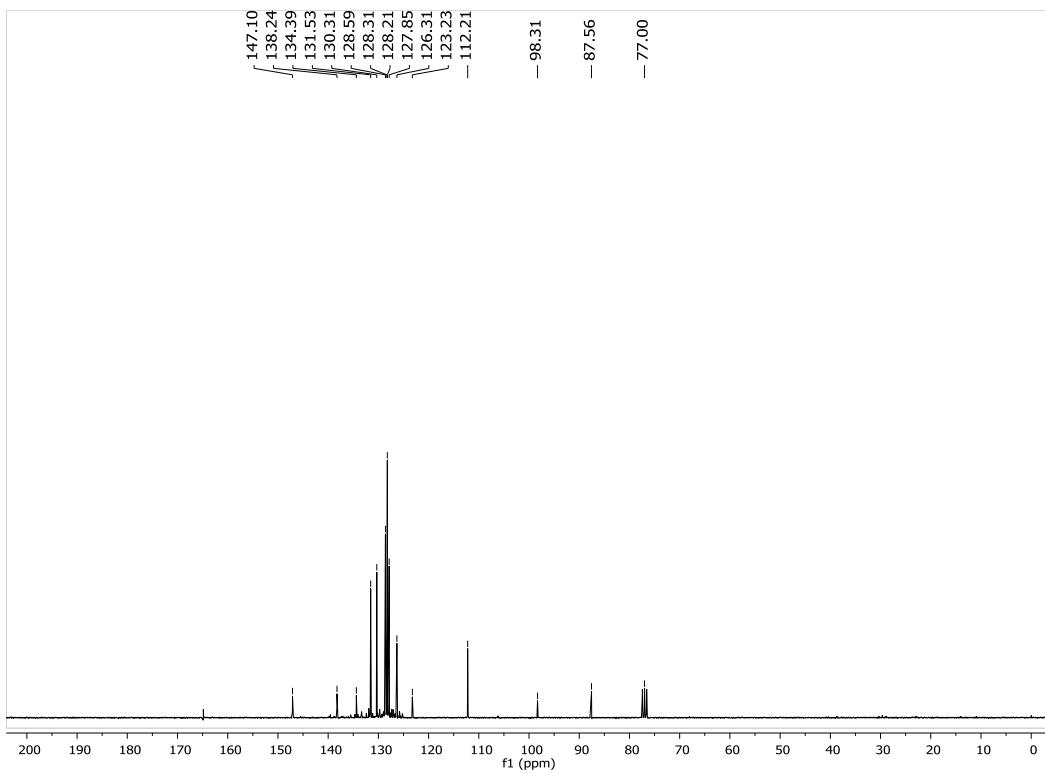


Figure S4. ¹³C NMR (75 MHz, CDCl₃) spectrum of (Z)-1-phenylthio-1,4-diphenylbut-1-en-3-yne (**3b**).

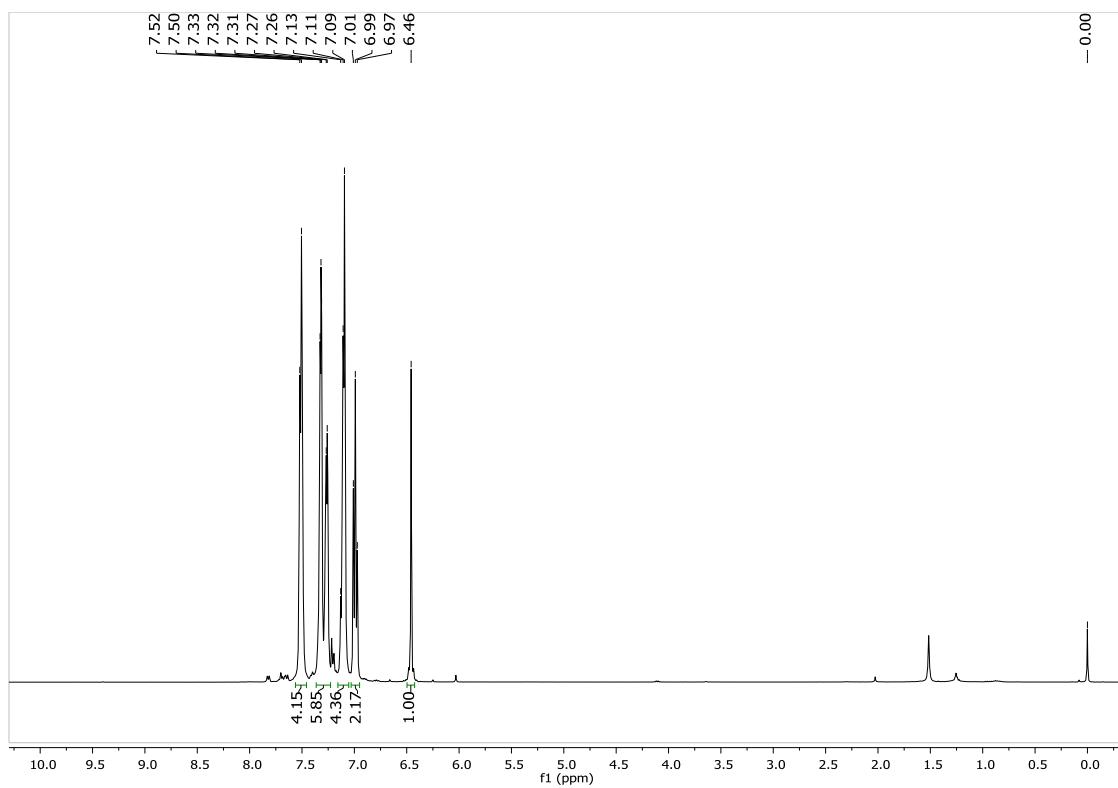


Figure S5. ¹H NMR (400 MHz, CDCl₃) spectrum of (Z)-1-phenyltellanyl-1,4-diphenylbut-1-en-3-yne (**3c**).

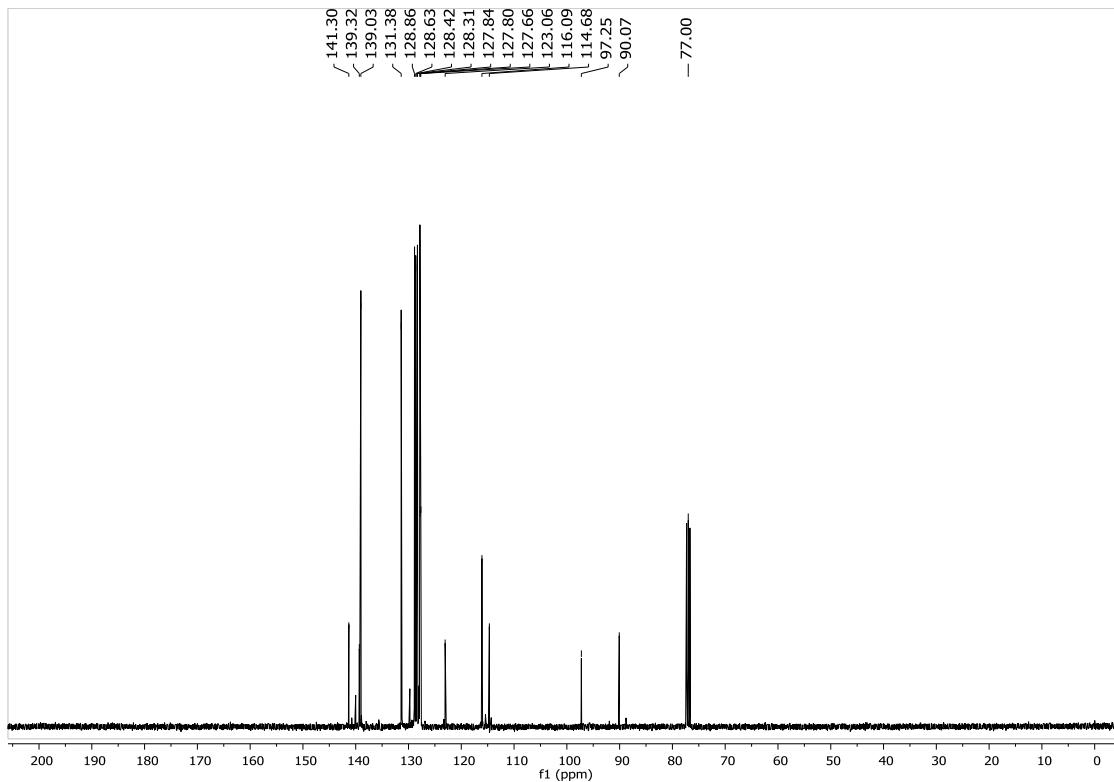


Figure S6. ¹³C NMR (100 MHz, CDCl₃) spectrum of (Z)-1-phenyltellanyl-1,4-diphenylbut-1-en-3-yne (**3c**).

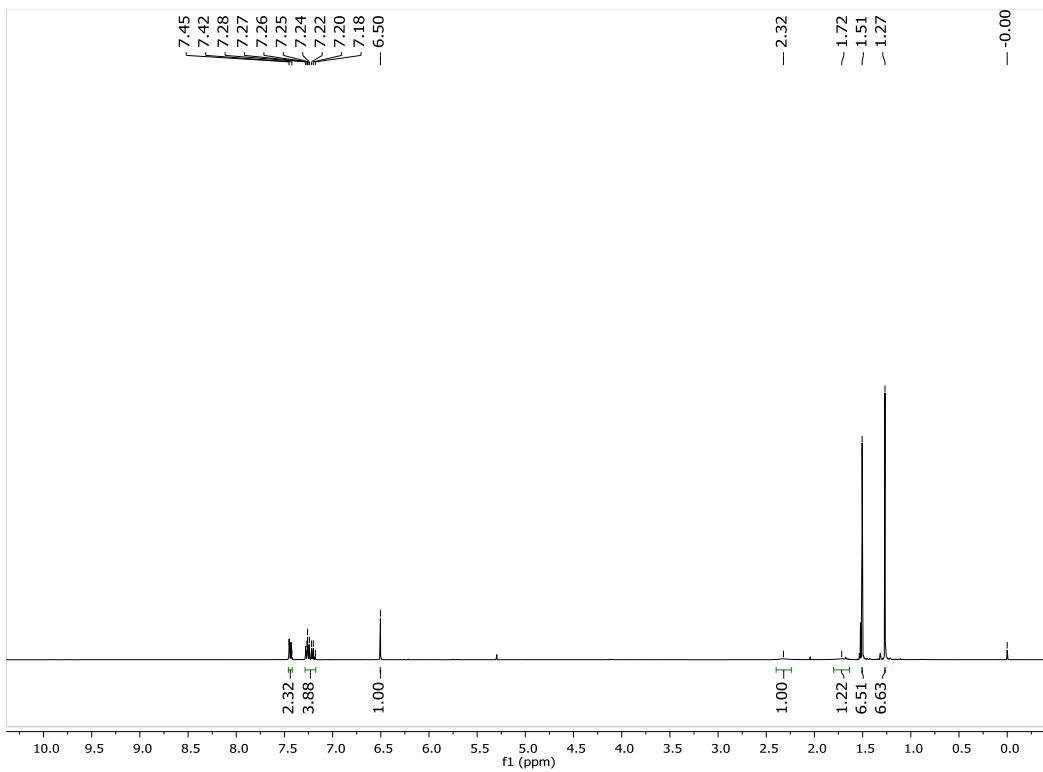


Figure S7. ¹H NMR (400 MHz, CDCl₃) spectrum of (Z)-2,7-dimethyl-3-(phenylselanyl)oct-3-en-5-yne-2,7-diol (**3d**).

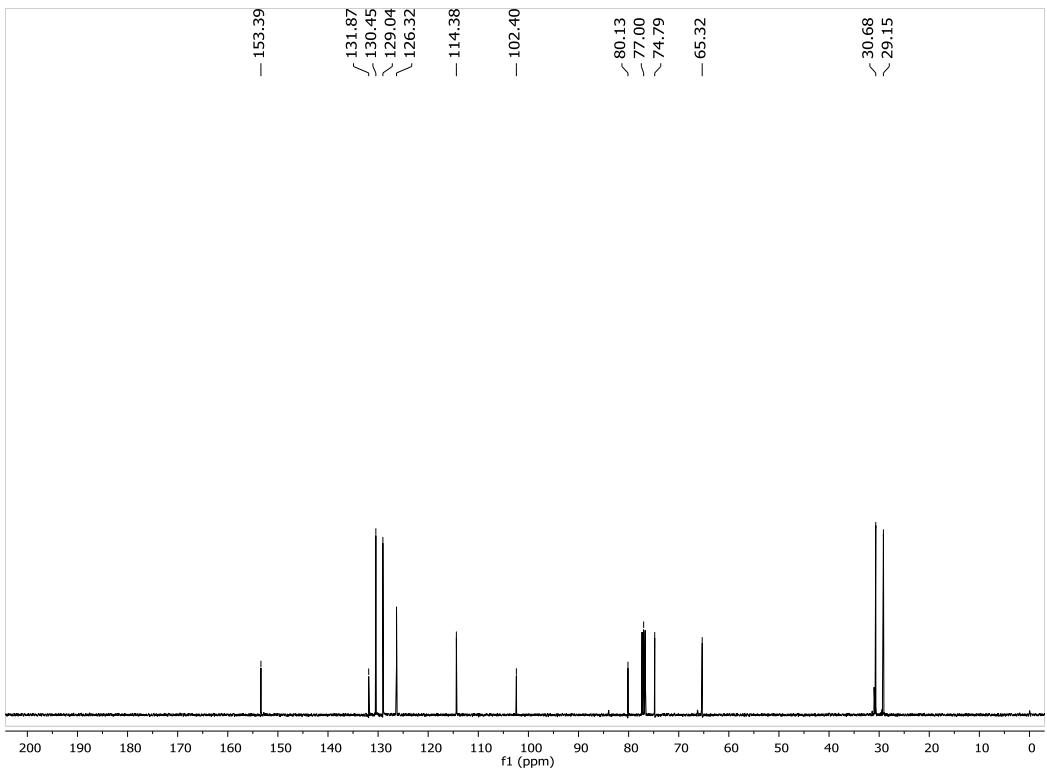


Figure S8. ^{13}C NMR (100 MHz, CDCl_3) spectrum of (*Z*)-2,7-dimethyl-3-(phenylselanyl)oct-3-en-5-yne-2,7-diol (**3d**).

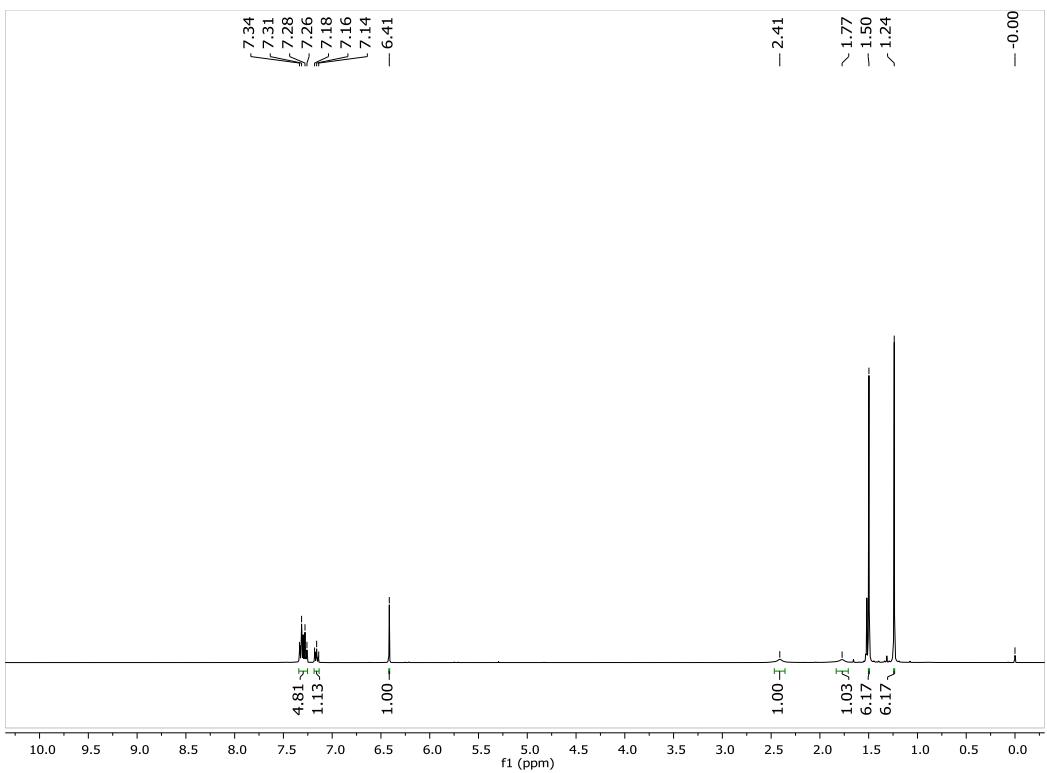


Figure S9. ^1H NMR (400 MHz, CDCl_3) spectrum of (*Z*)-2,7-dimethyl-3-(phenylthio)oct-3-en-5-yne-2,7-diol (**3e**).

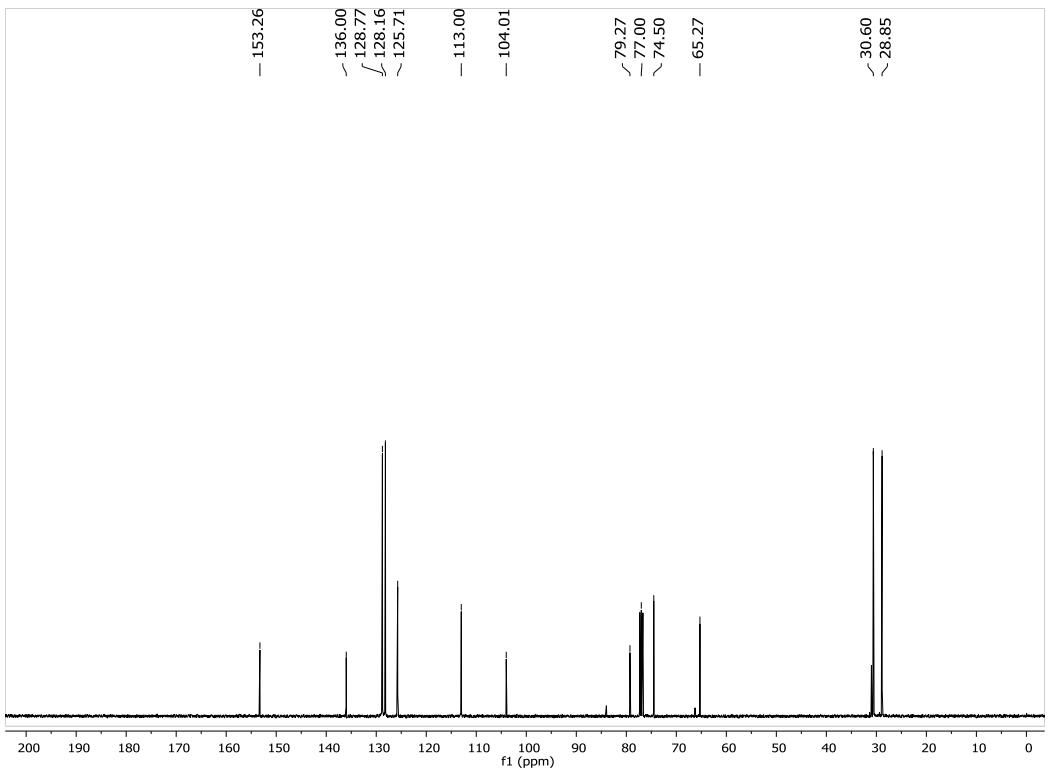


Figure S10. ¹³C NMR (100 MHz, CDCl₃) spectrum of (Z)-2,7-dimethyl-3-(phenylthio)oct-3-en-5-yne-2,7-diol (**3e**).

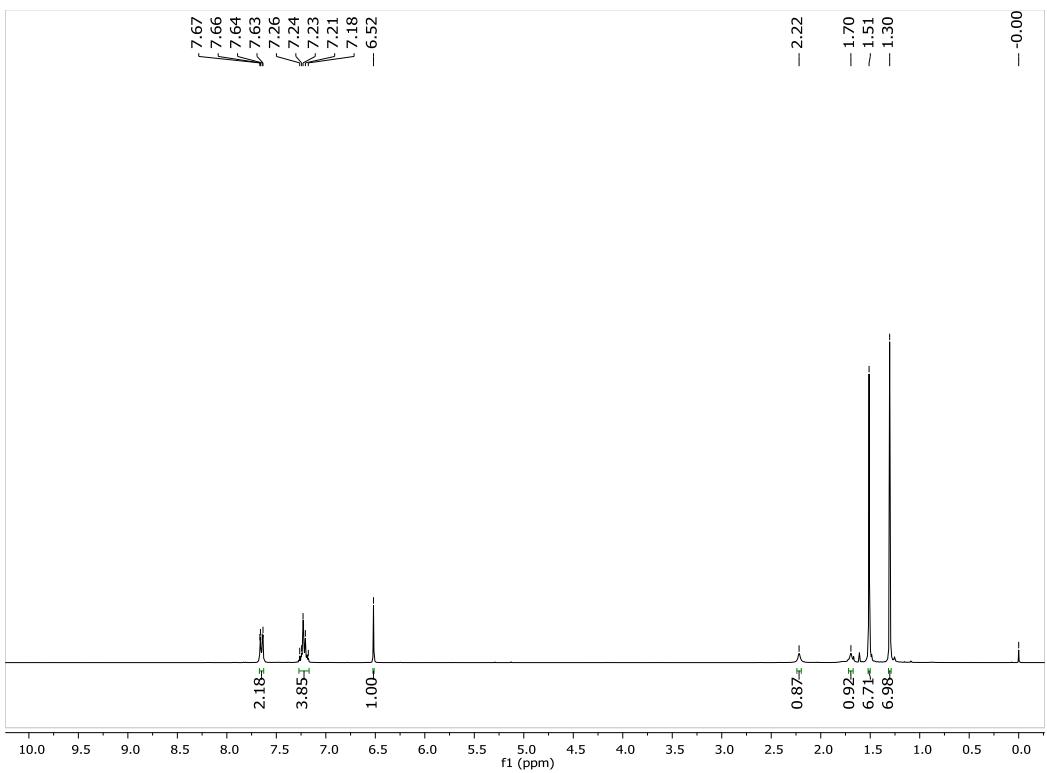


Figure S11. ¹H NMR (300 MHz, CDCl₃) spectrum of (Z)-2,7-dimethyl-3-(phenyltellanyl)oct-3-en-5-yne-2,7-diol (**3f**).

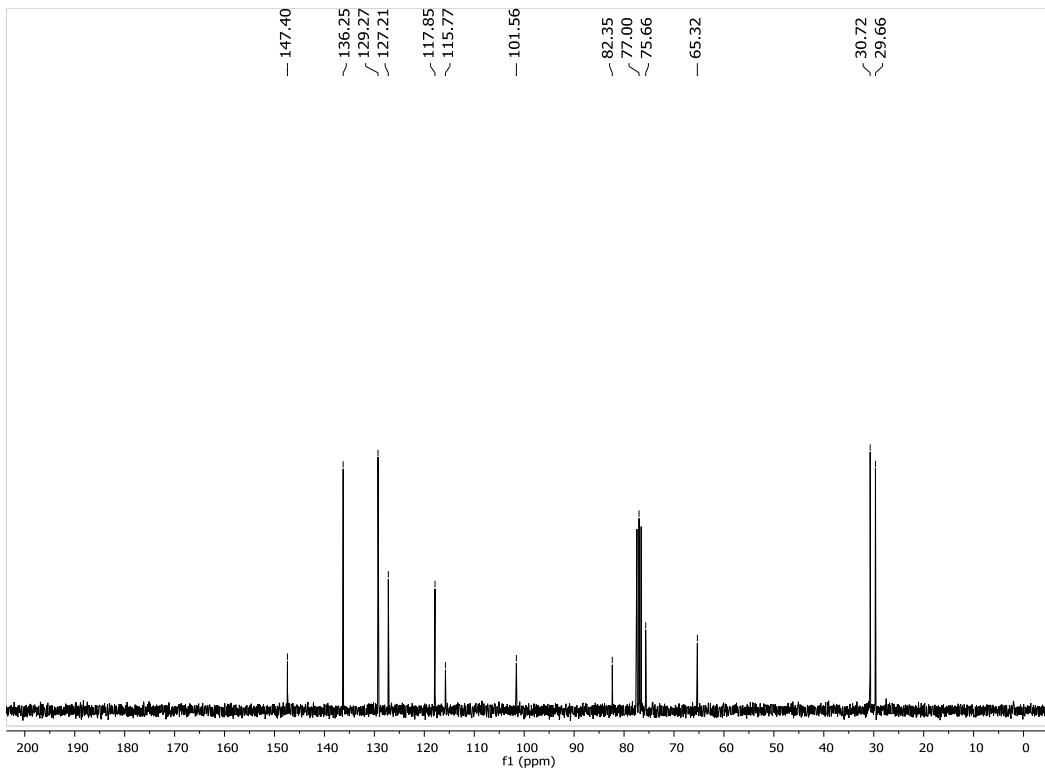


Figure S12. ¹³C NMR (75 MHz, CDCl₃) spectrum of (Z)-2,7-dimethyl-3-(phenyltellanyl)oct-3-en-5-yne-2,7-diol (**3f**).

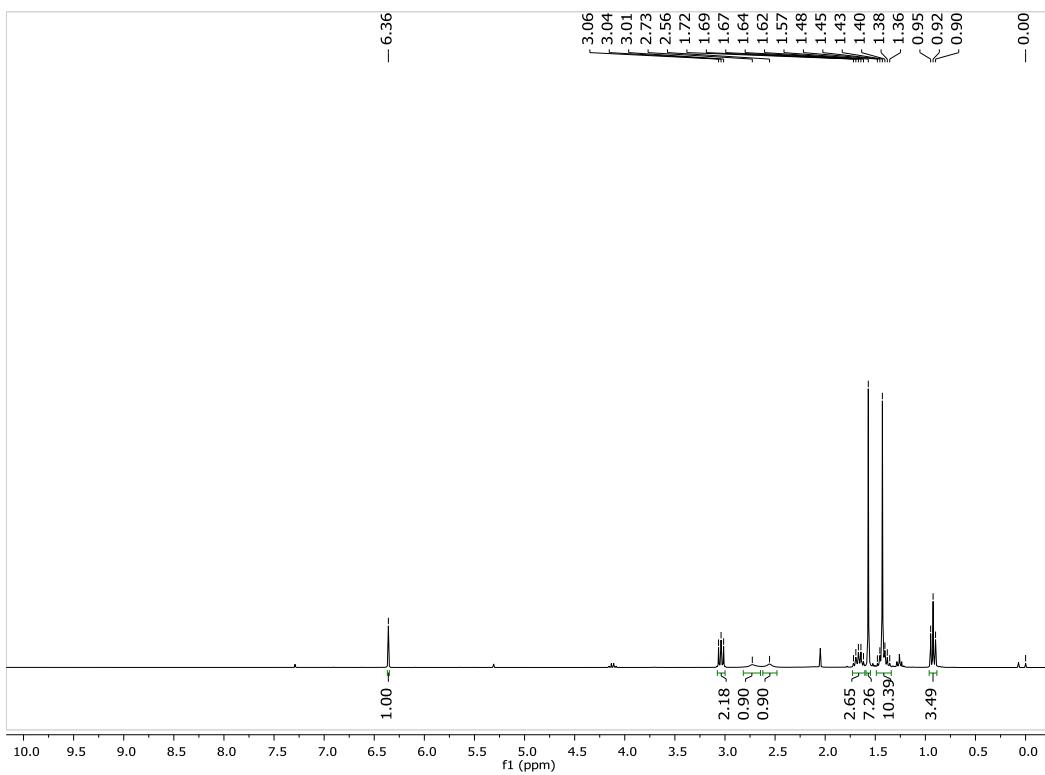


Figure S13. ¹H NMR (300 MHz, CDCl₃) spectrum of (Z)-2,7-dimethyl-3-(butylselanyl)oct-3-en-5-yne-2,7-diol (**3g**).

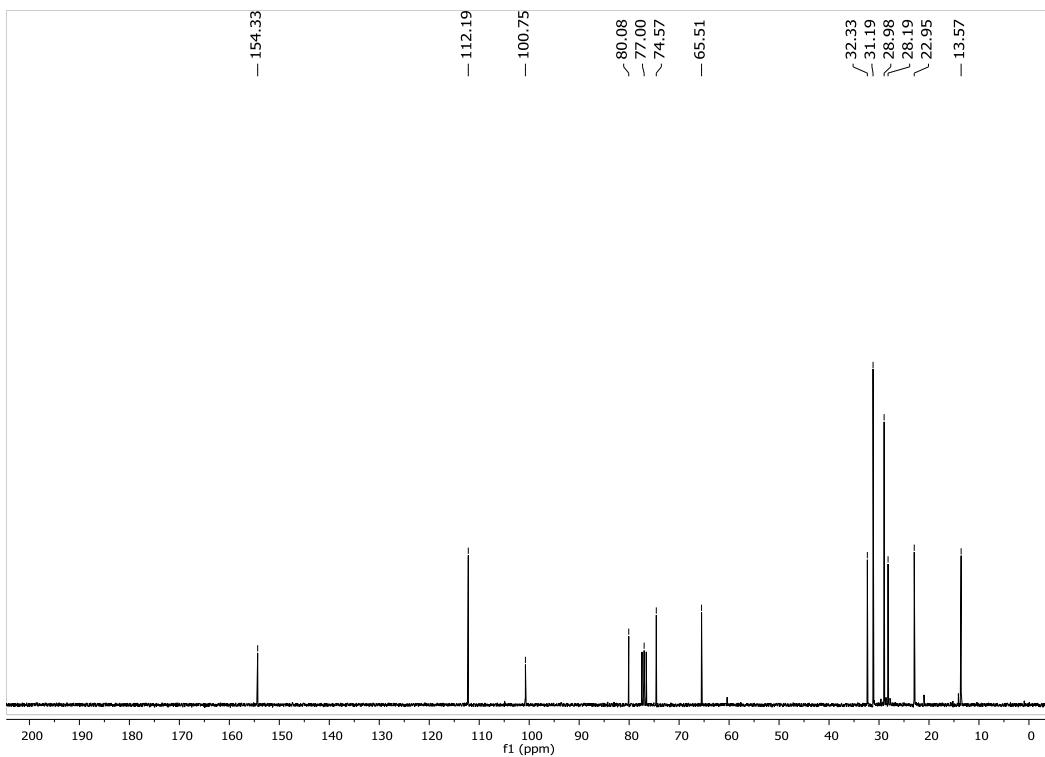


Figure S14. ^{13}C NMR (75 MHz, CDCl_3) spectrum of (*Z*)-2,7-dimethyl-3-(butylselanyl)oct-3-en-5-yne-2,7-diol (**3g**).

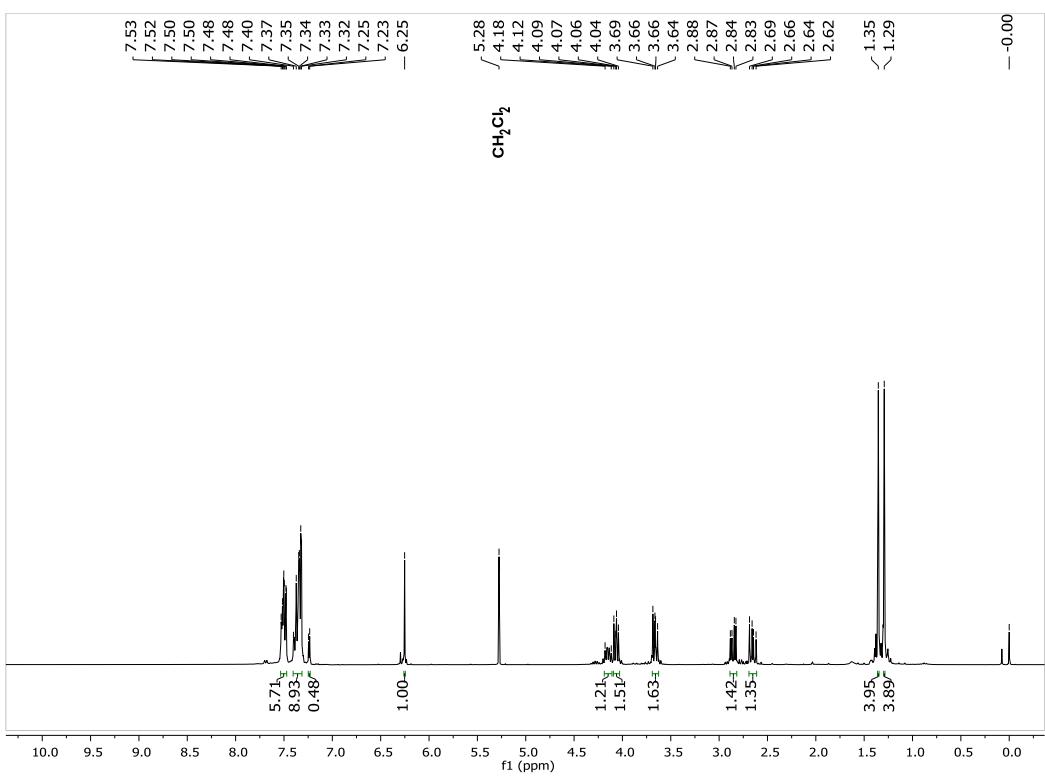


Figure S15. ^1H NMR (300 MHz, CDCl_3) spectrum of (*Z*)-2,2-dimethyl-1,3-dioxolanylmethyl(1,4-diphenylbut-1-en-3-yn-1-yl)selane (**3h**).

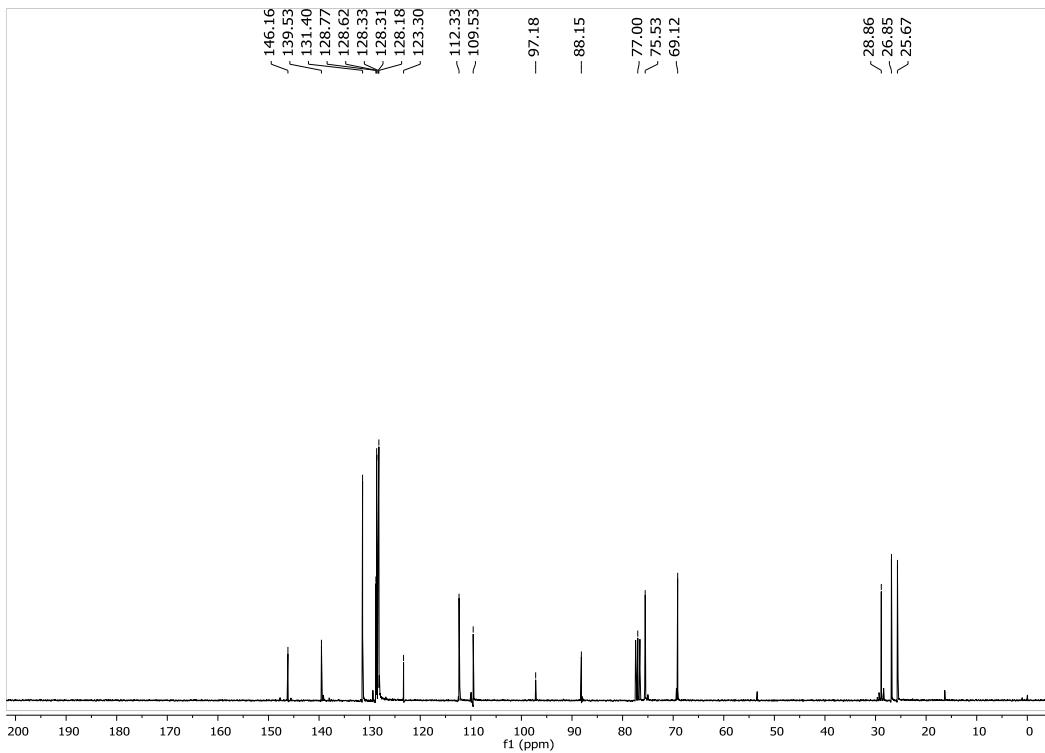


Figure S16. ^{13}C NMR (75 MHz, CDCl_3) spectrum of (*Z*)-2,2-dimethyl-1,3-dioxolanylmethyl(1,4-diphenylbut-1-en-3-yn-1-yl)selane (**3h**).

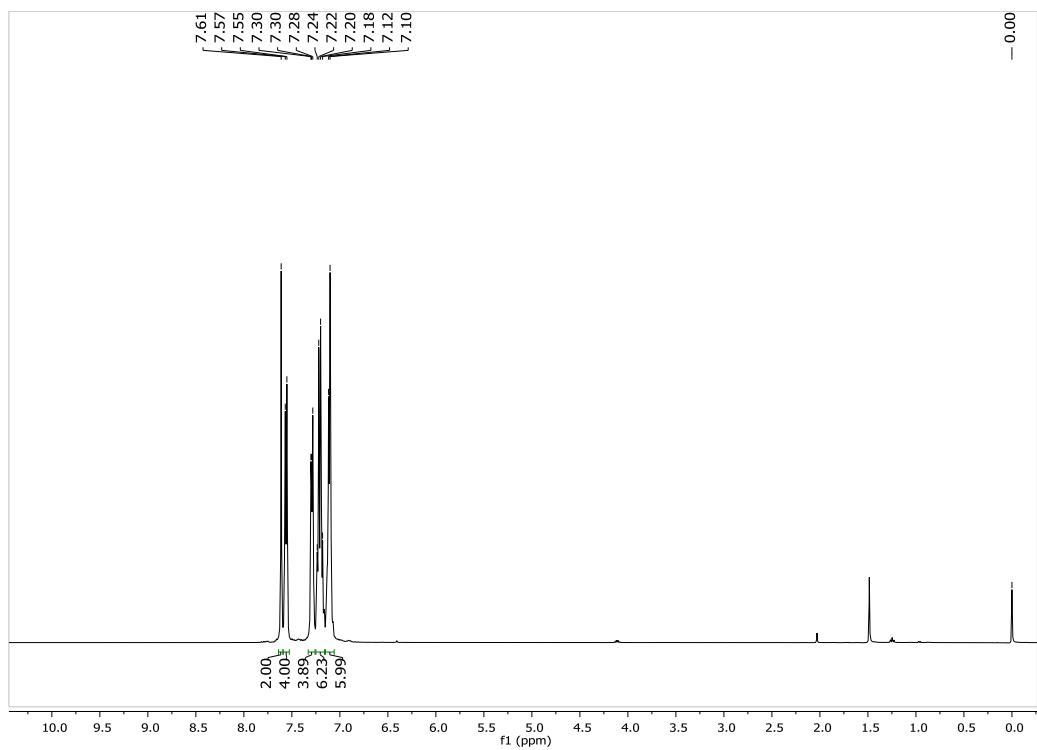


Figure S17. ^1H NMR (400 MHz, CDCl_3) spectrum of (*1Z,3Z*)-1,4-diphenyl-1,4-bis(phenylselanyl)buta-1,3-diene (**4a**).

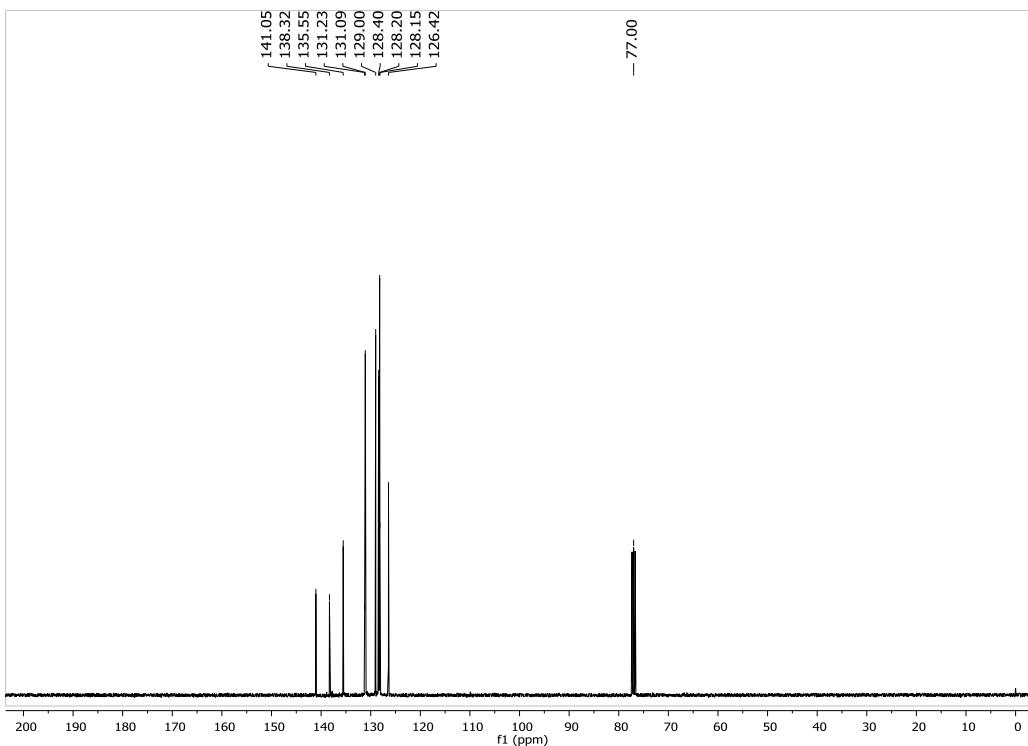


Figure S18. ¹³C NMR (100 MHz, CDCl₃) spectrum of (1*Z*,3*Z*)-1,4-diphenyl-1,4-bis(phenylselanyl)buta-1,3-diene (**4a**).

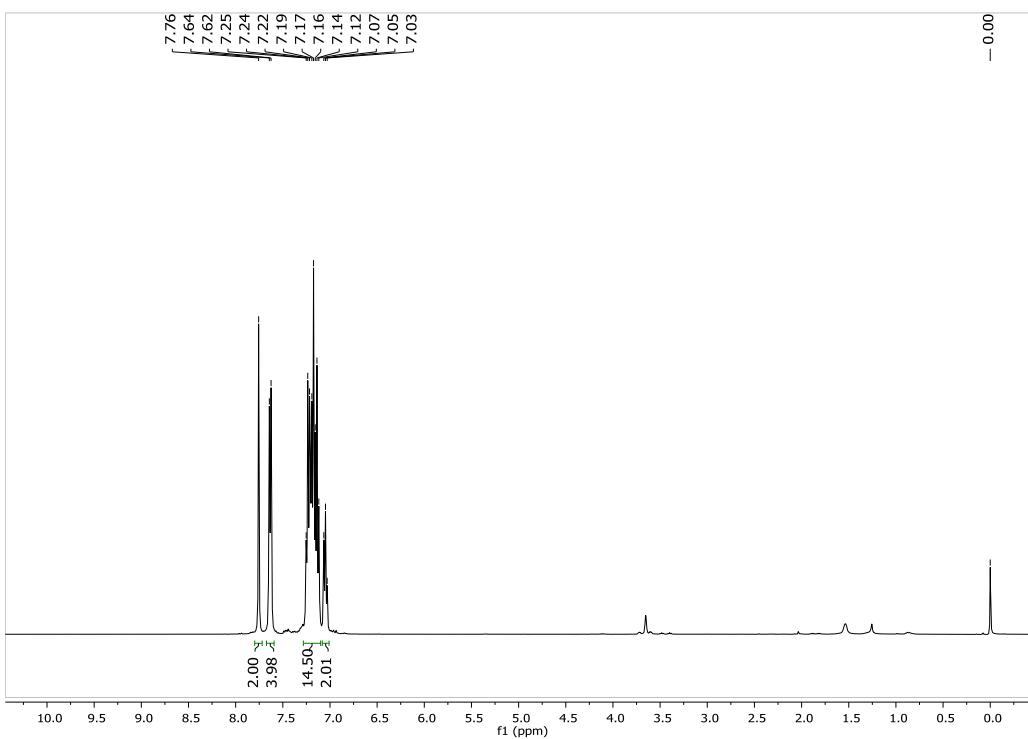


Figure S19. ¹H NMR (300 MHz, CDCl₃) spectrum of (1*Z*,3*Z*)-1,4-diphenyl-1,4-bis(phenylthio)buta-1,3-diene (**4b**).

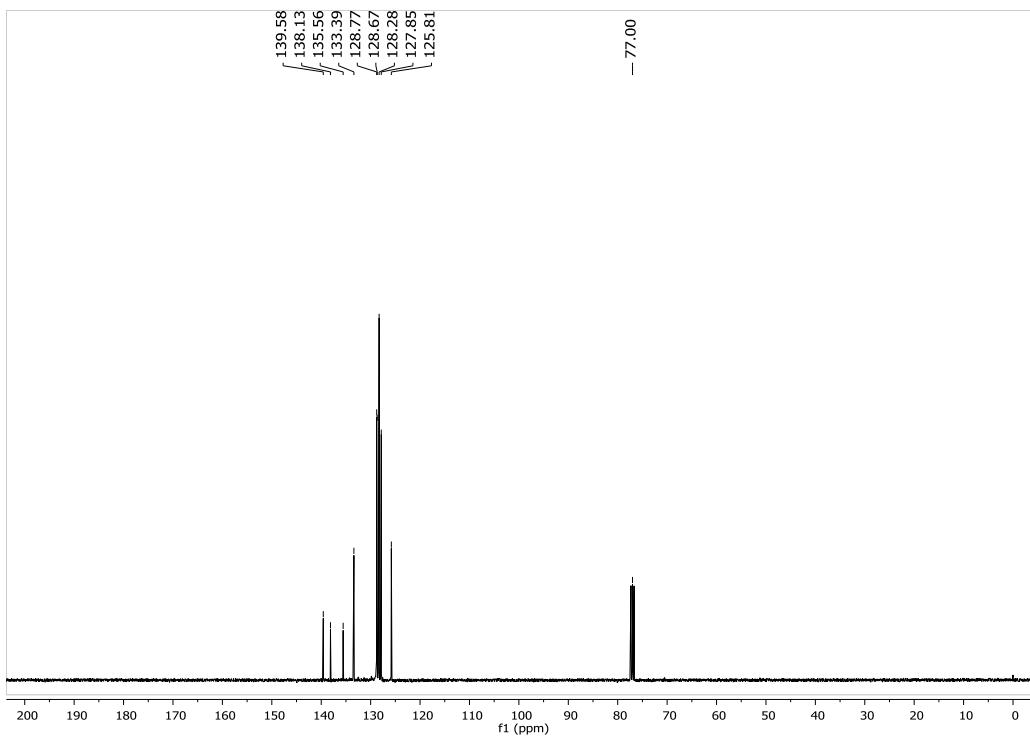


Figure S20. ¹³C NMR (75 MHz, CDCl₃) spectrum of (1Z,3Z)-1,4-diphenyl-1,4-bis(phenylthio)buta-1,3-diene (**4b**).

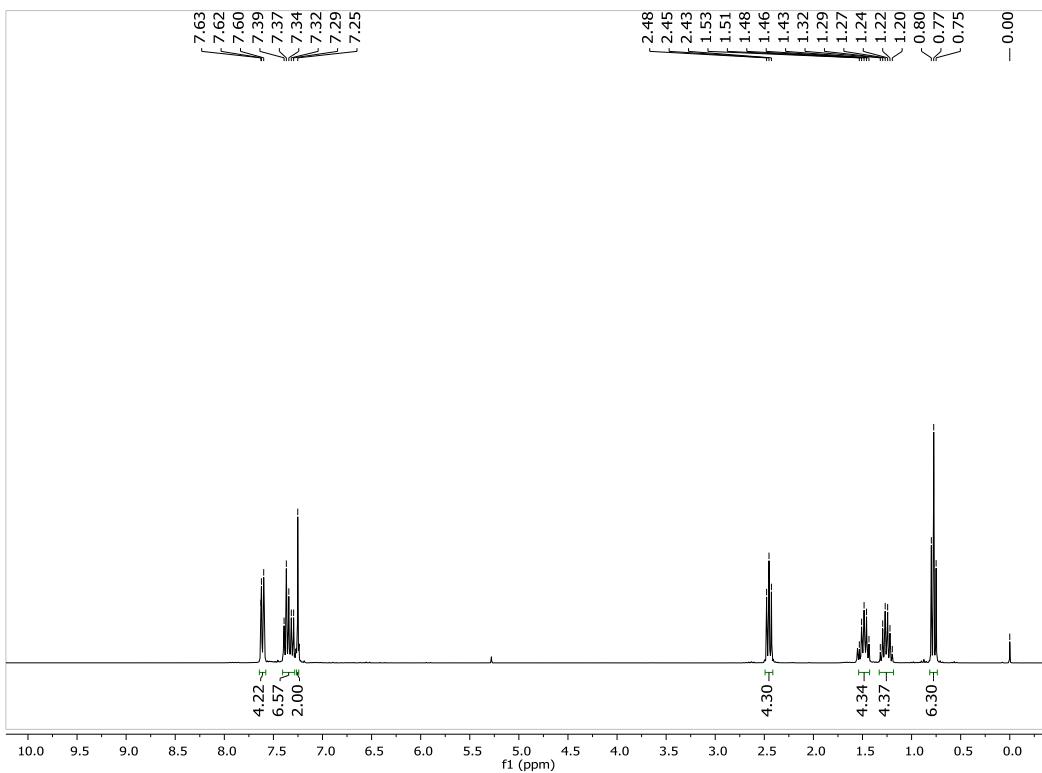


Figure S21. ¹H NMR (300 MHz, CDCl₃) spectrum of (1Z,3Z)-1,4-bis(buthylselanyl)-1,4-diphenylbuta-1,3-diene (**4c**).

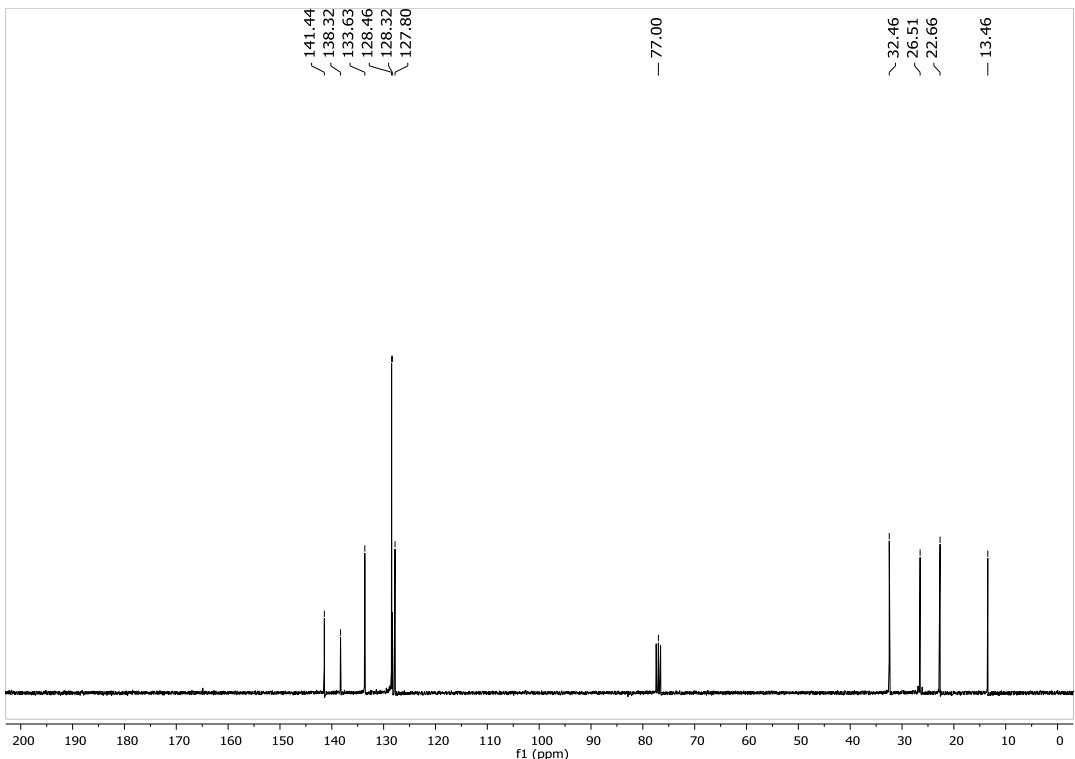


Figure S22. ^{13}C NMR (75 MHz, CDCl_3) spectrum of ($1\text{Z},3\text{Z}$)-1,4-bis(buthylselanyl)-1,4-diphenylbuta-1,3-diene (**4c**).

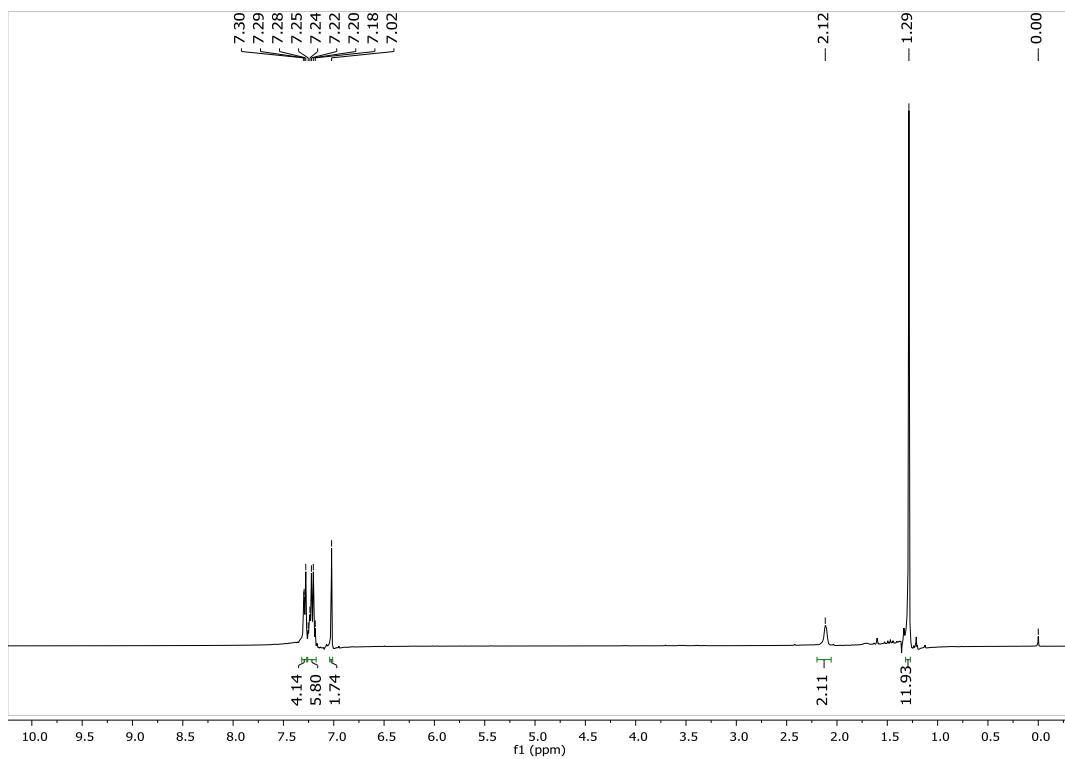


Figure S23. ^1H NMR (400 MHz, CDCl_3) spectrum of ($3\text{Z},5\text{Z}$)-2,7-dimethyl-3,6-bis(phenylselanyl)-octa-3,5-diene-2,7-diol (**4d**).

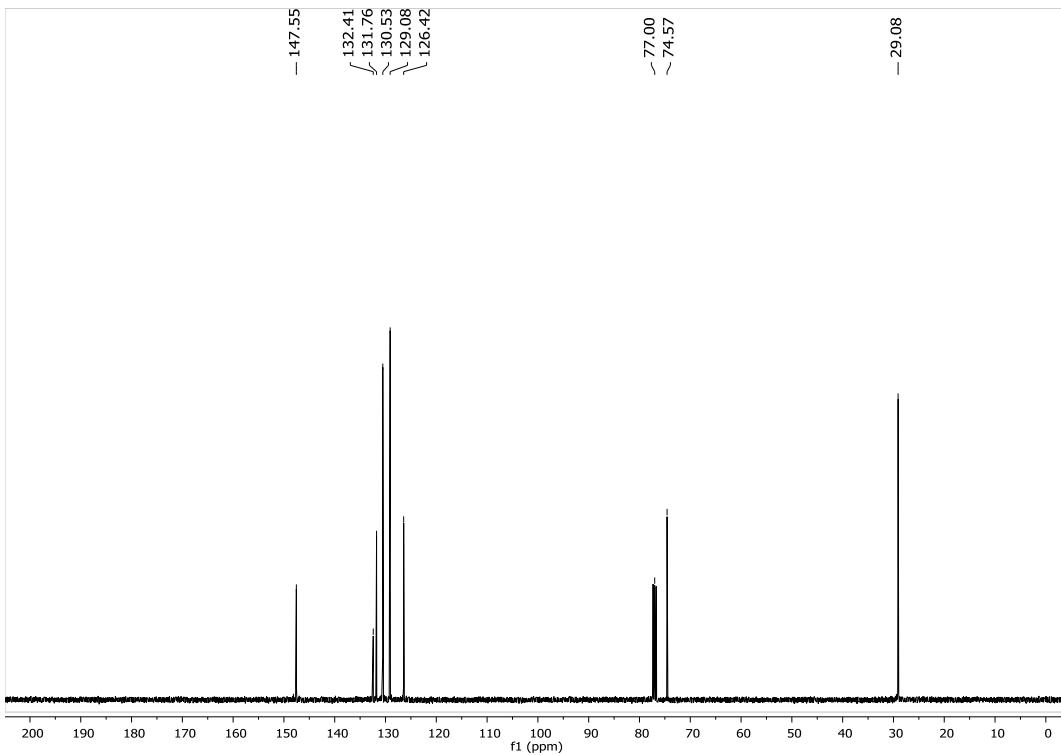


Figure S24. ¹³C NMR (100 MHz, CDCl₃) spectrum of (3Z,5Z)-2,7-dimethyl-3,6-bis(phenylselanyl)-octa-3,5-diene-2,7-diol (**4d**).