

Supplementary Information

Palladium Nanoparticles Supported on Poly(*N*-vinylpyrrolidone)-Grafted Silica as an Efficient Catalyst for Copper-Free Sonogashira and Suzuki Cross-Coupling Reactions

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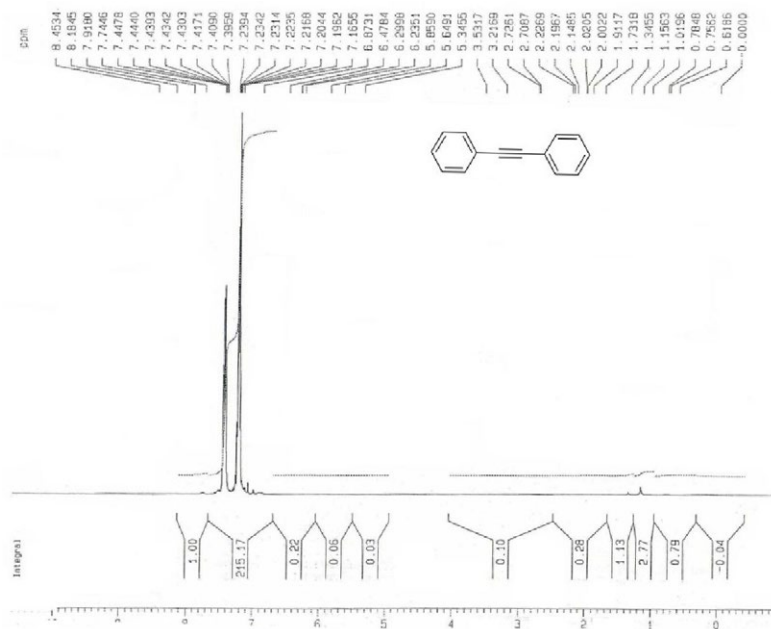
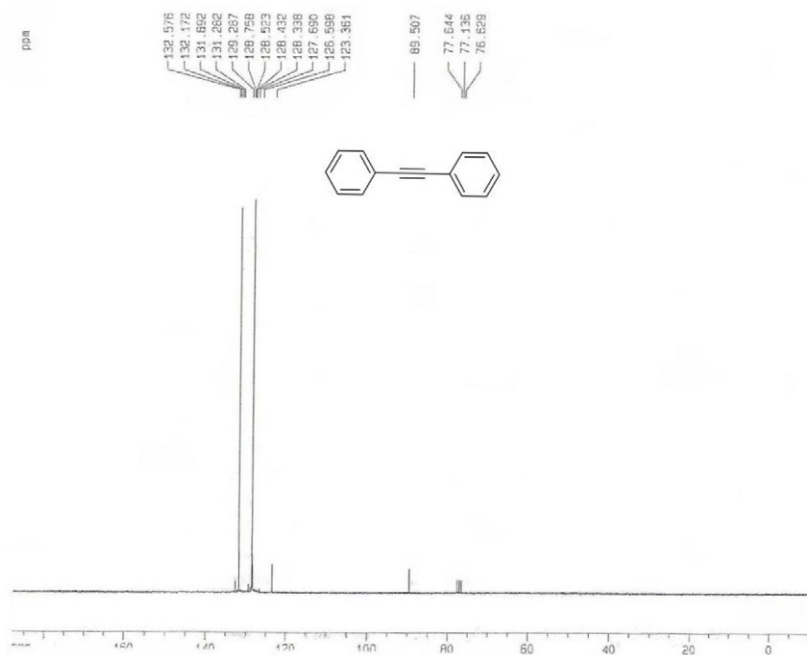
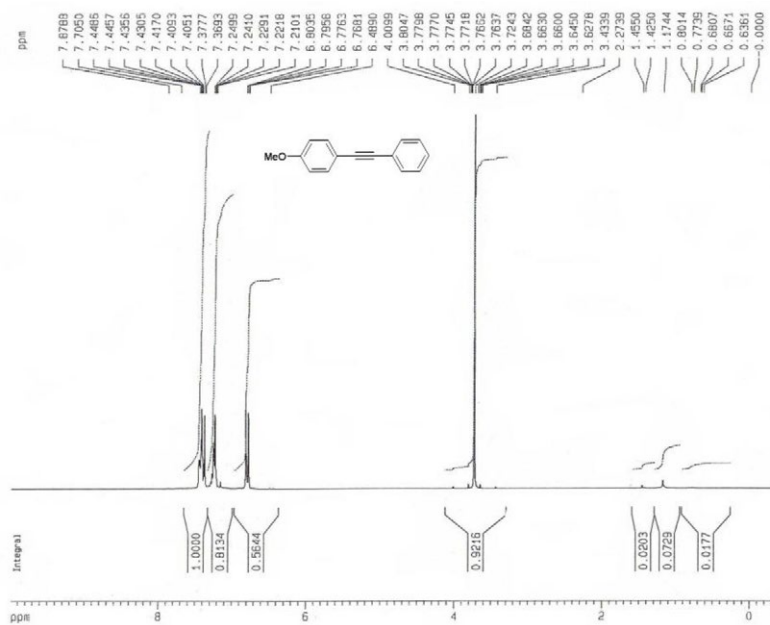


Figure S1. ¹H NMR (250 MHz, CDCl₃) of 1,2-diphenylethyne.

**Figure S2.** ¹³C NMR (60 MHz, CDCl₃) of 1,2-diphenylethyne.**Figure S3.** ¹H NMR (250 MHz, CDCl₃) of 1-methoxy-4-(phenylethynyl)benzene.

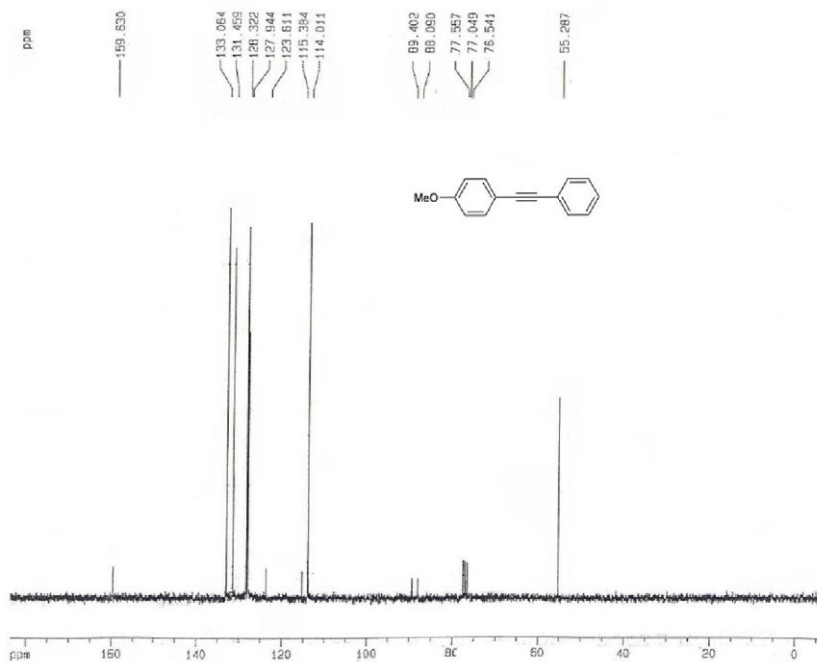


Figure S4. ^{13}C NMR (60 MHz, CDCl_3) of 1-methoxy-4-(phenylethynyl)benzene.

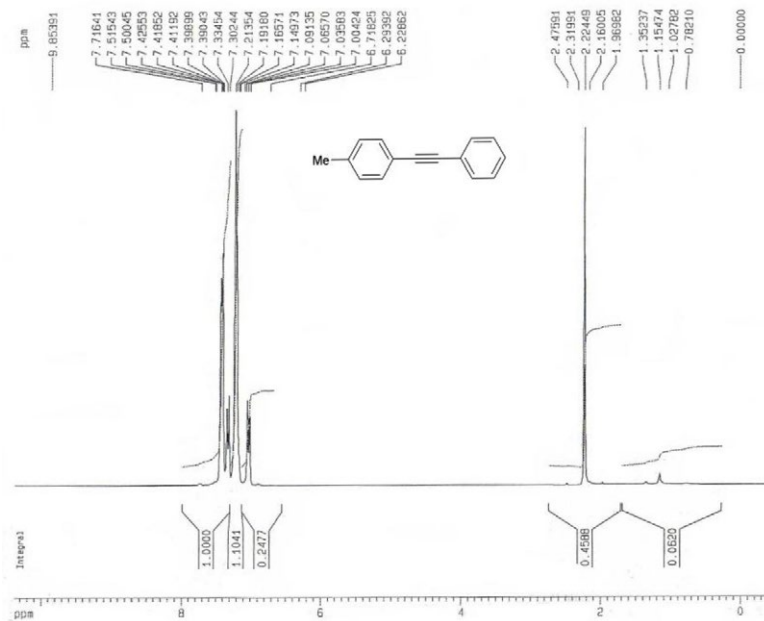
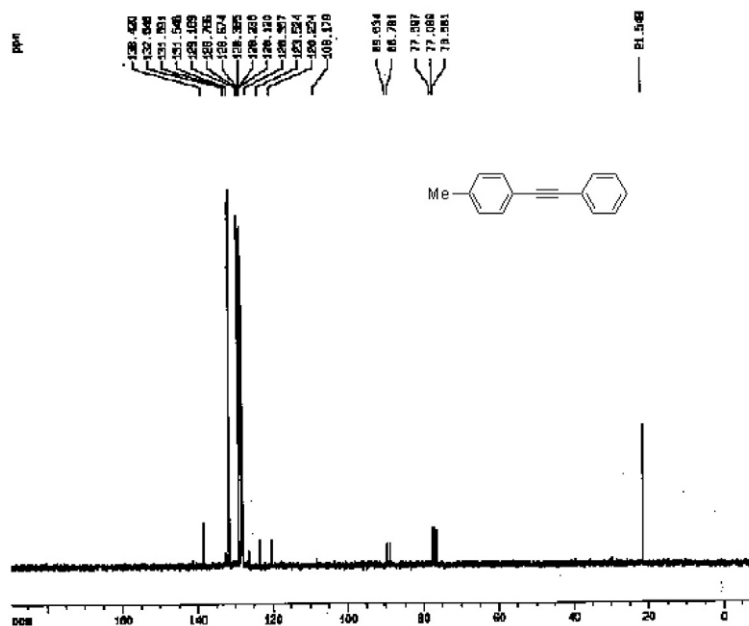
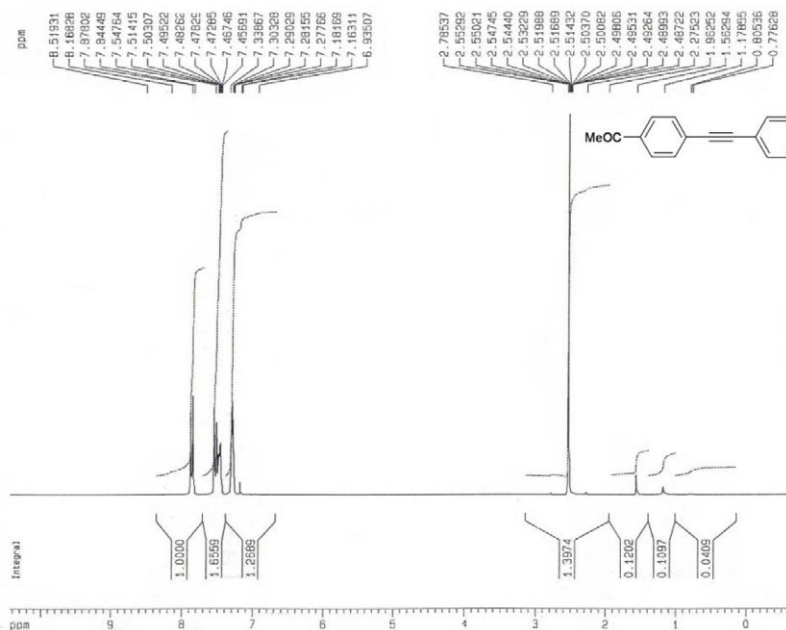


Figure S5. ^1H NMR (250 MHz, CDCl_3) of 1-methyl-4-(phenylethynyl)benzene.

**Figure S6.** ^{13}C NMR (60 MHz, CDCl_3) of 1-methyl-4-(phenylethynyl)benzene.**Figure S7.** ^1H NMR (250 MHz, CDCl_3) of 1-(4-(phenylethynyl)phenyl)ethan-1-one.

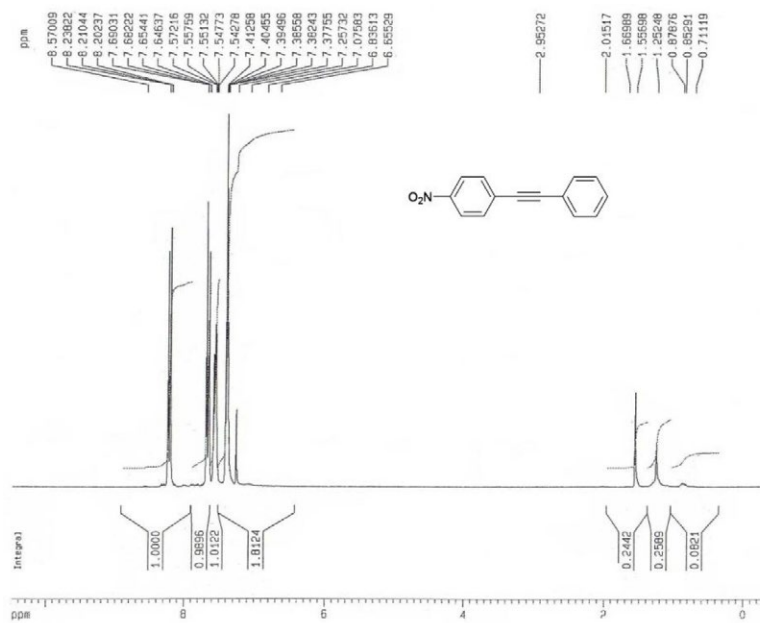


Figure S8. ^1H NMR (250 MHz, CDCl_3) of 1-nitro-4-(phenylethynyl)benzene.

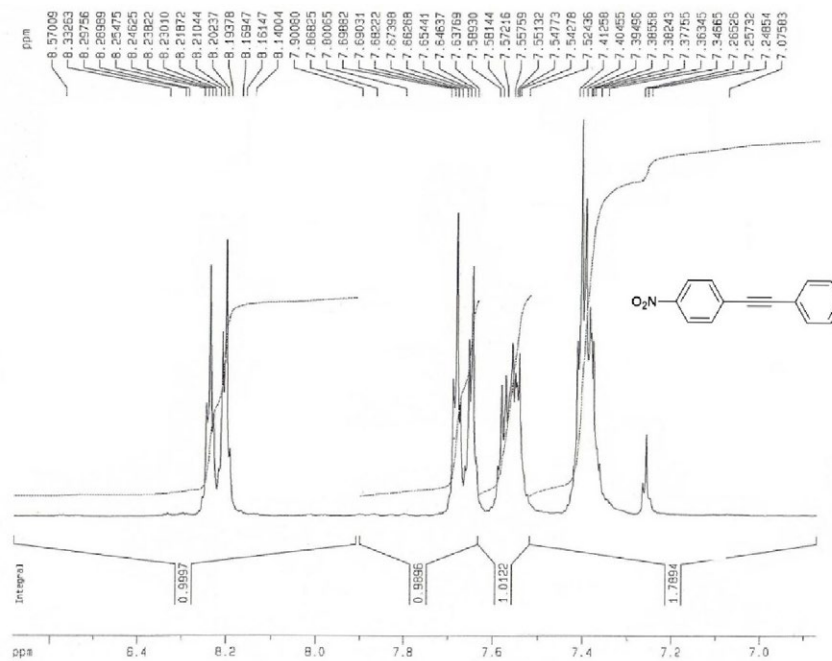


Figure S9. Aromatic area for ^1H NMR (250 MHz, CDCl_3) of 1-nitro-4-(phenylethynyl)benzene.

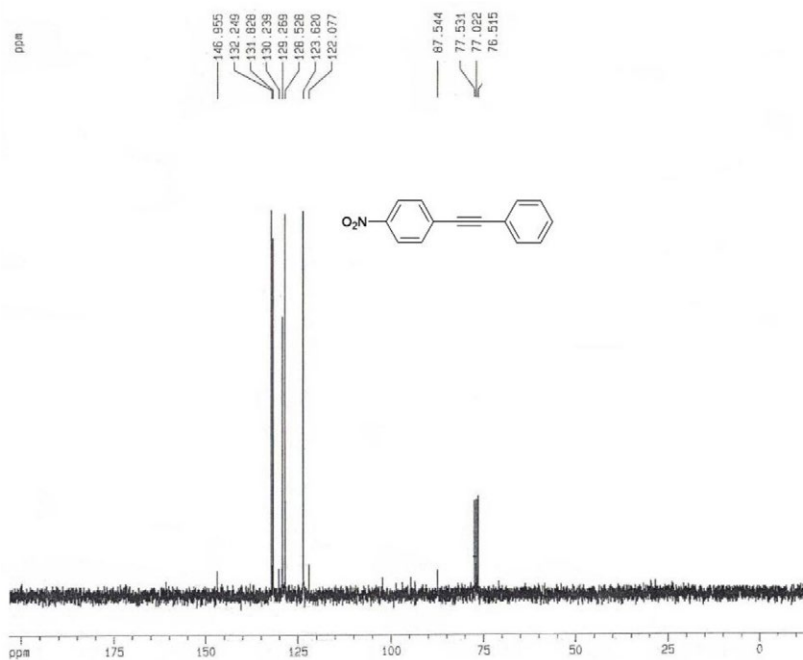


Figure S10. ^{13}C NMR (60 MHz, CDCl_3) of 1-nitro-4-(phenylethynyl)benzene.

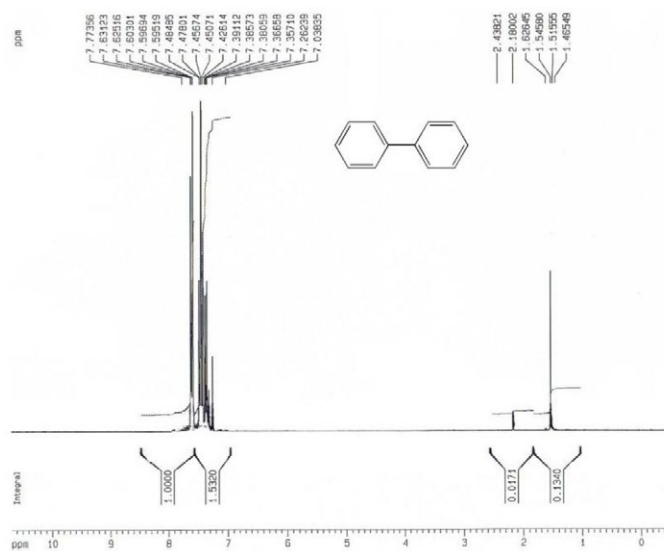


Figure S11. ^1H NMR (250 MHz, CDCl_3) of 1,1'-biphenyl.

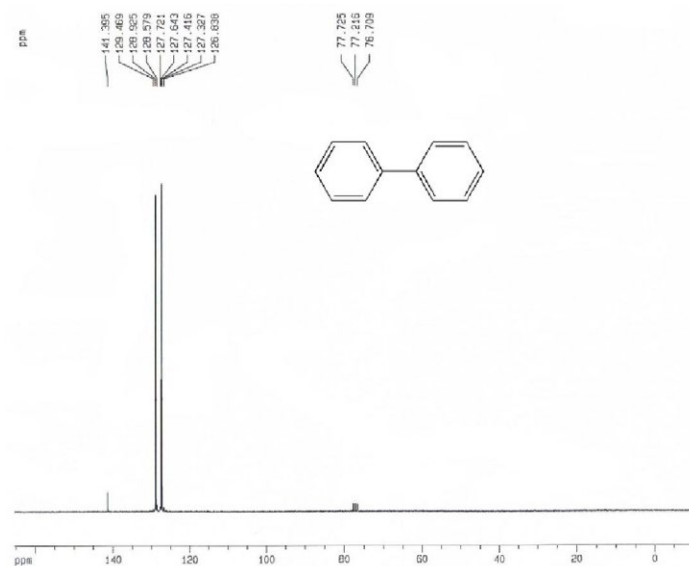


Figure S12. ¹³C NMR (60 MHz, CDCl₃) of 1,1'-biphenyl.

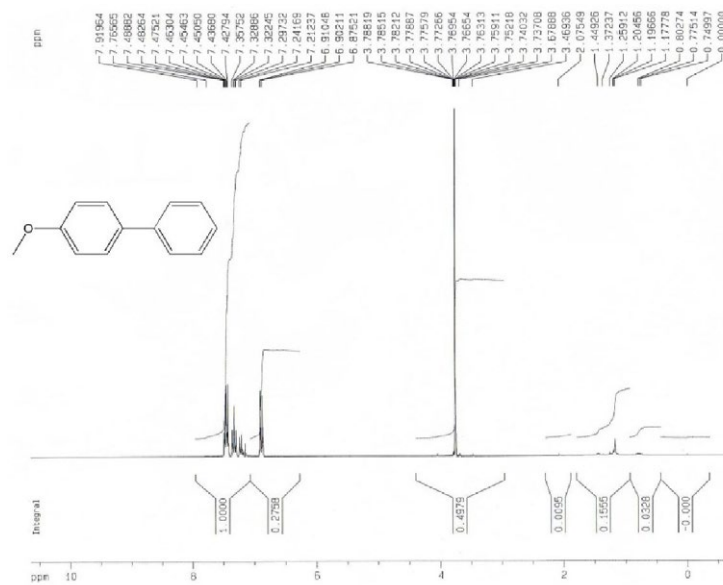
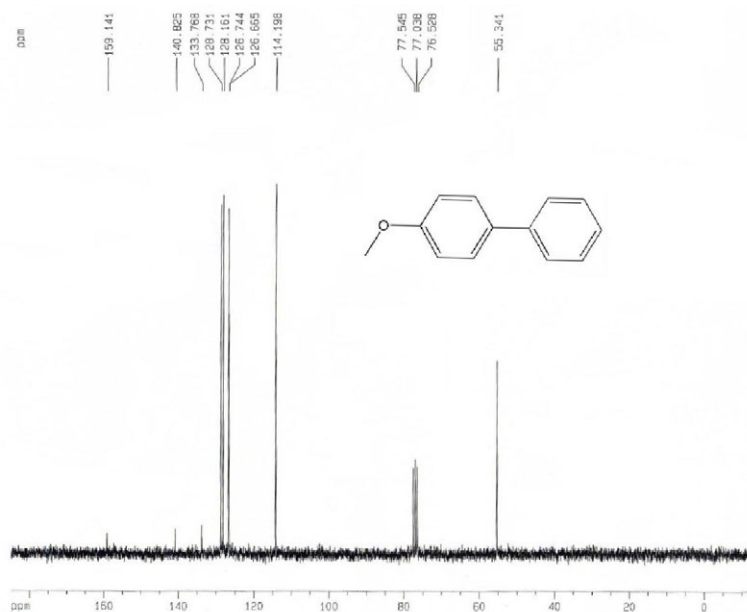
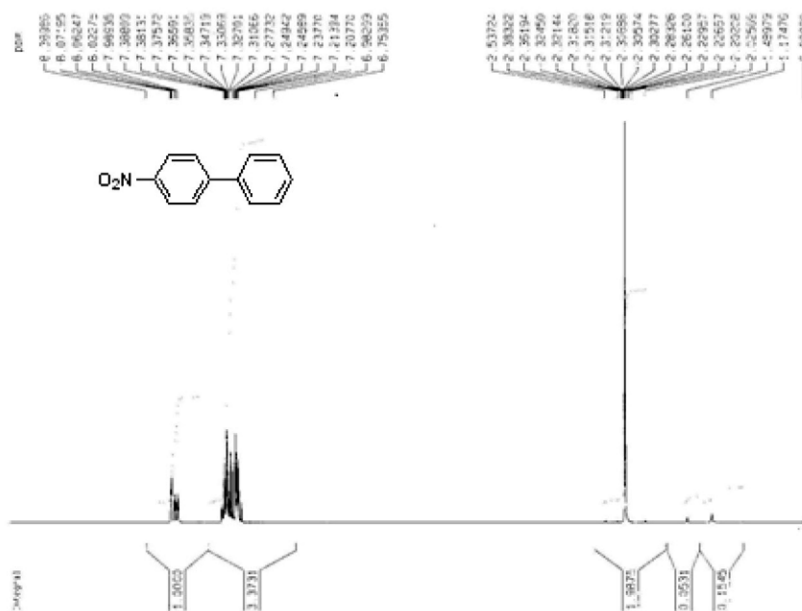


Figure S13. ¹H NMR (250 MHz, CDCl₃) of 4-methoxy-1,1'-biphenyl.

**Figure S14.** ^{13}C NMR (60 MHz, CDCl_3) of 4-methoxy-1,1'-biphenyl.**Figure S15.** ^1H NMR (250 MHz, CDCl_3) of 4-nitro-1,1'-biphenyl.

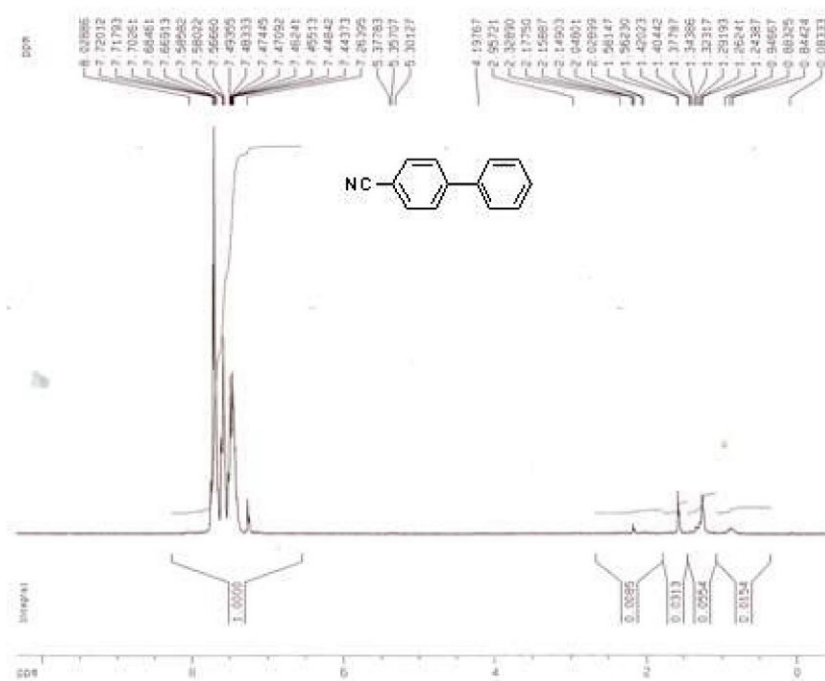


Figure S16. ^1H NMR (250 MHz, CDCl_3) of [1,1'-biphenyl]-4-carbonitrile.

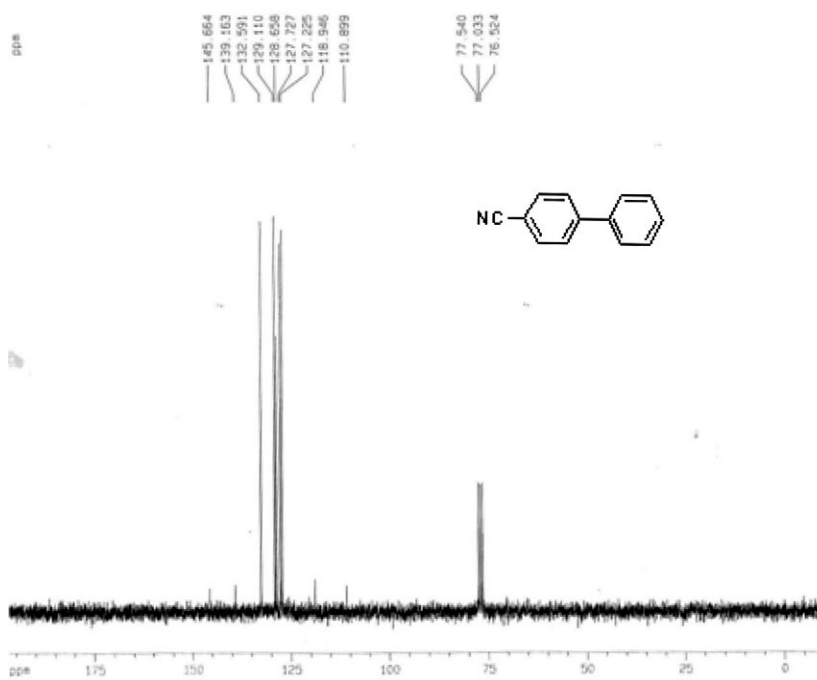


Figure S17. ^{13}C NMR (60 MHz, CDCl_3) of [1,1'-biphenyl]-4-carbonitrile.

