

Supporting Information

SBA-15 obtained from rice husk ashes wet-impregnated with metals (Al, Co, Ni) as efficient catalysts for 1,4-dihydropyridine three-component reaction

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Figure S1. Batch reaction system utilized in this study. Batch reactors: before reaction (left) and after reaction (right).

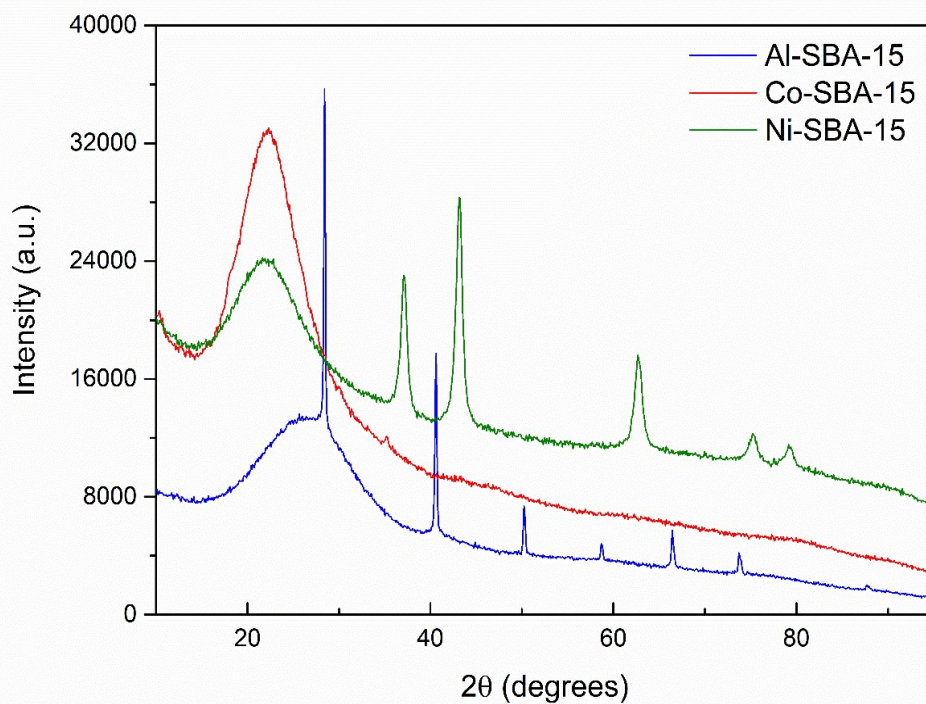


Figure S2. Wide-Angle XRD diffractogram of the catalysts prepared.

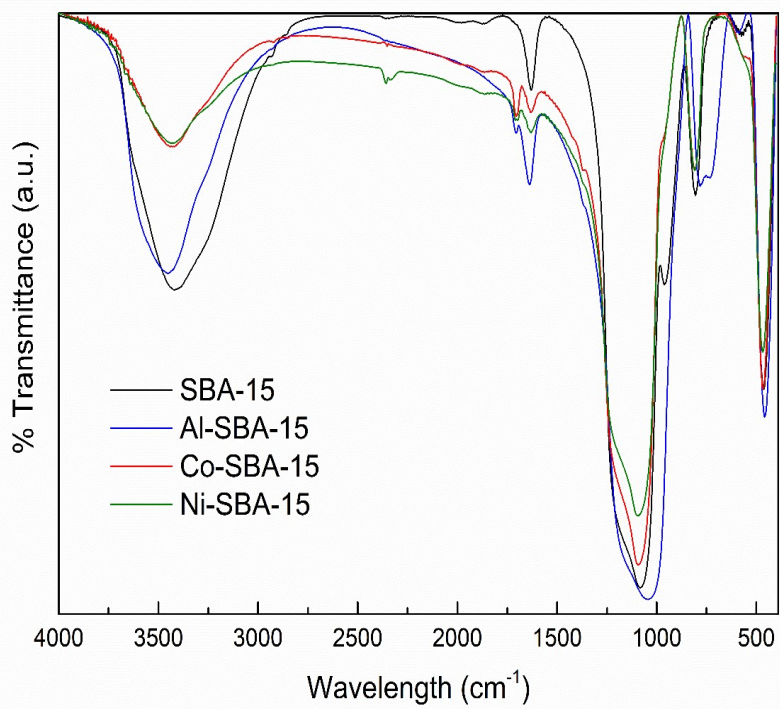


Figure S3. FT-IR spectra of the catalysts prepared.

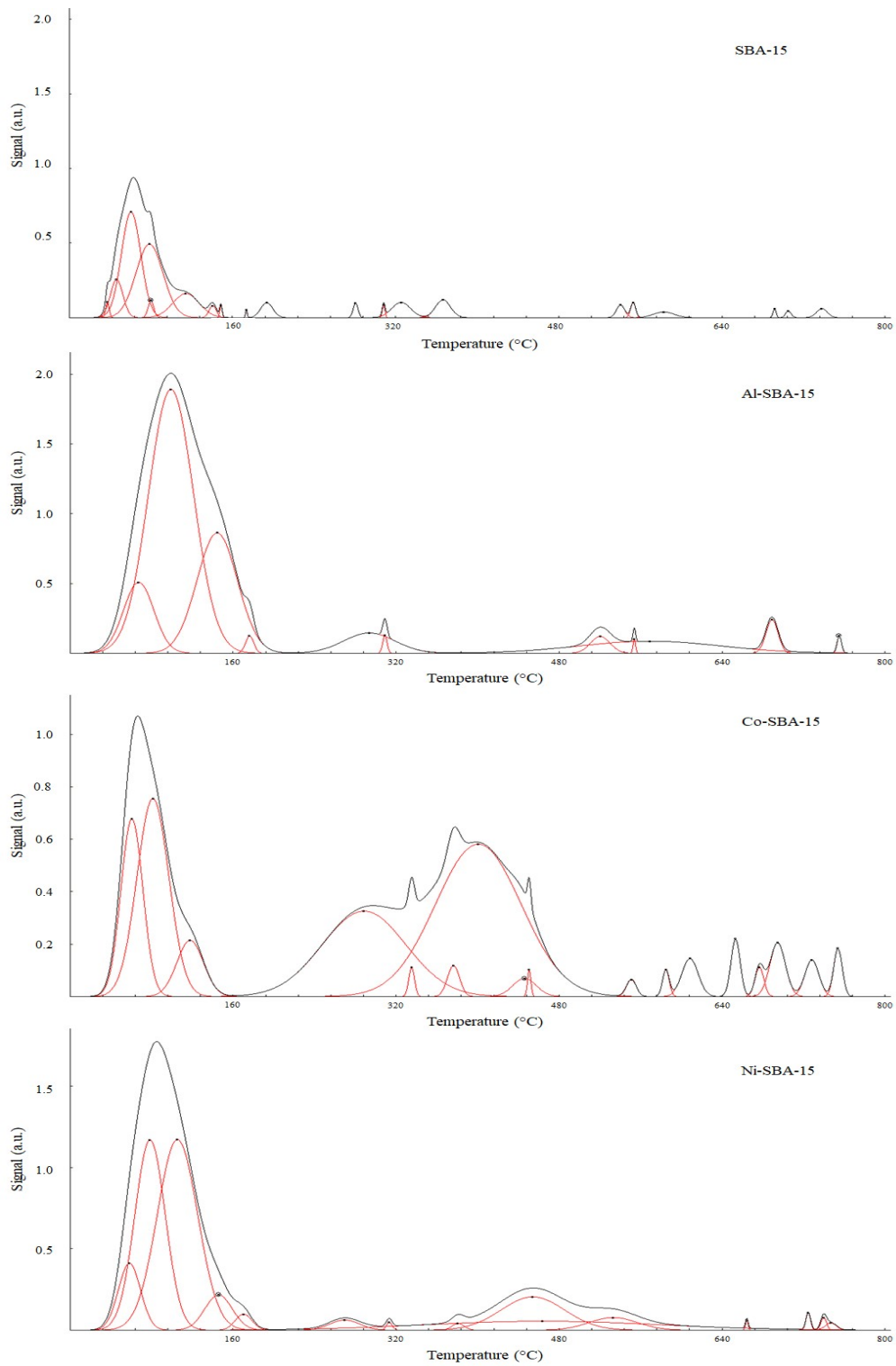


Figure S4. NH_3 -TPD analysis of the catalysts prepared.

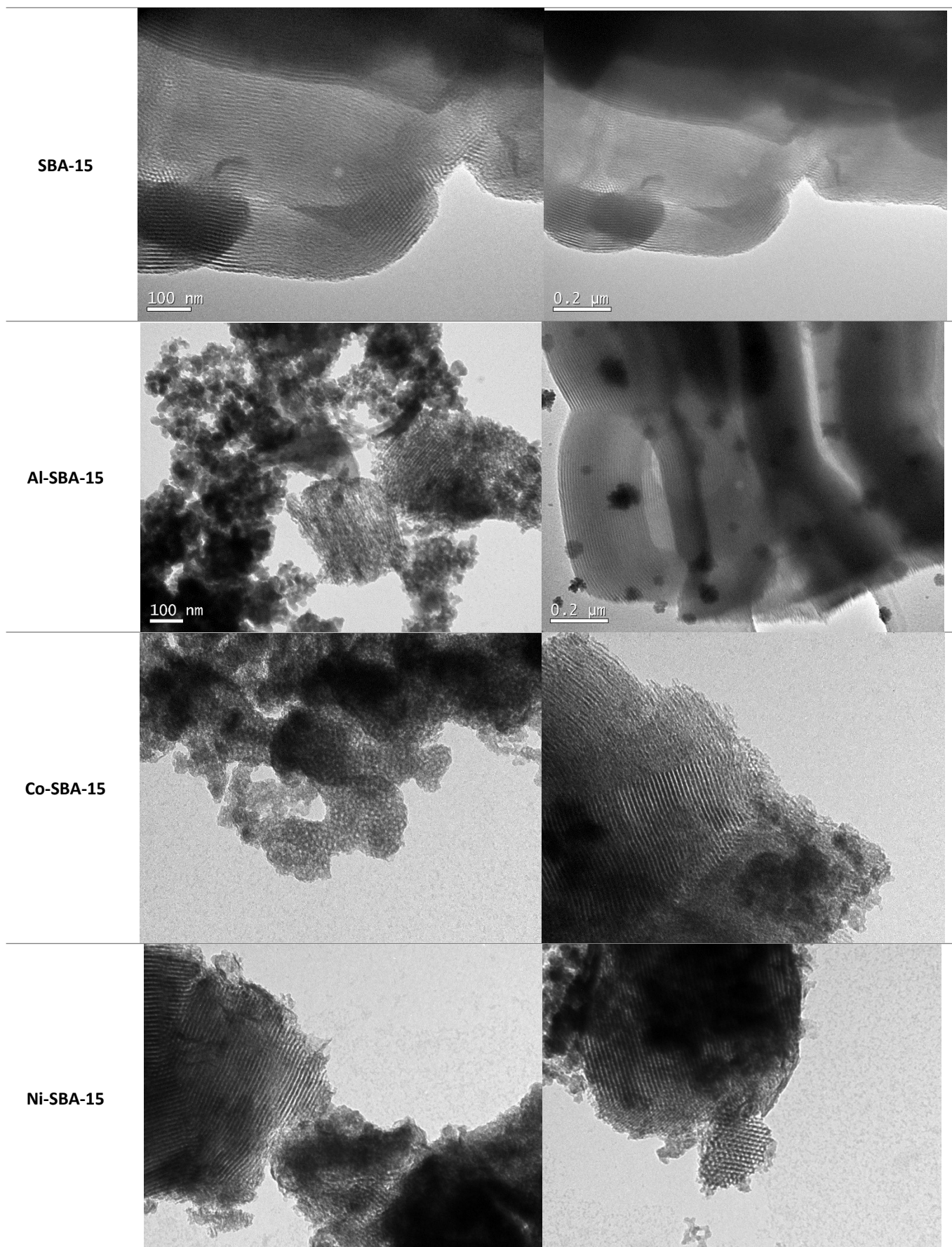


Figure S5. TEM micrographs of the catalysts prepared.

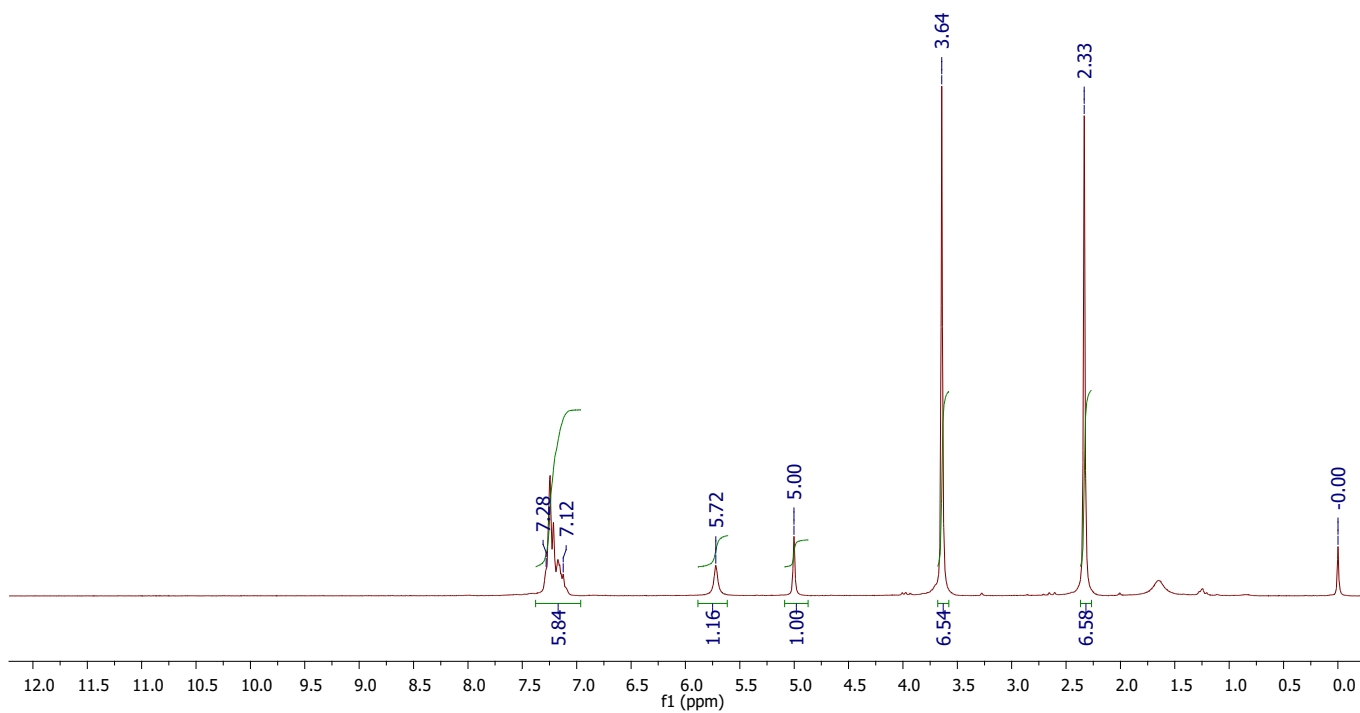


Figure S6. ^1H NMR (CDCl_3 , 200 MHz) of dimethyl 1,4-dihydro-2,6-dimethyl-4-phenylpyridine-3,5-dicarboxylate.

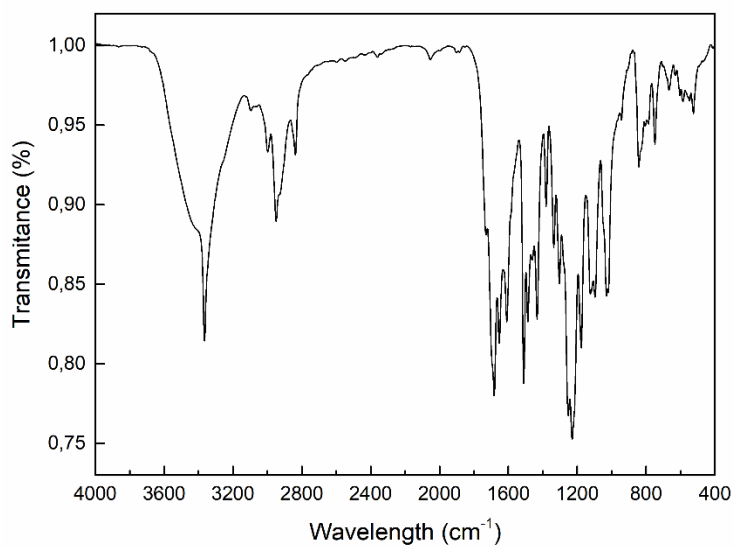
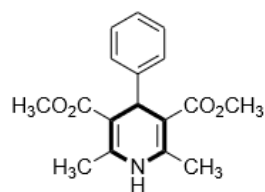


Figure S7. FT-IR spectrum of dimethyl 1,4-dihydro-2,6-dimethyl-4-phenylpyridine-3,5-dicarboxylate.

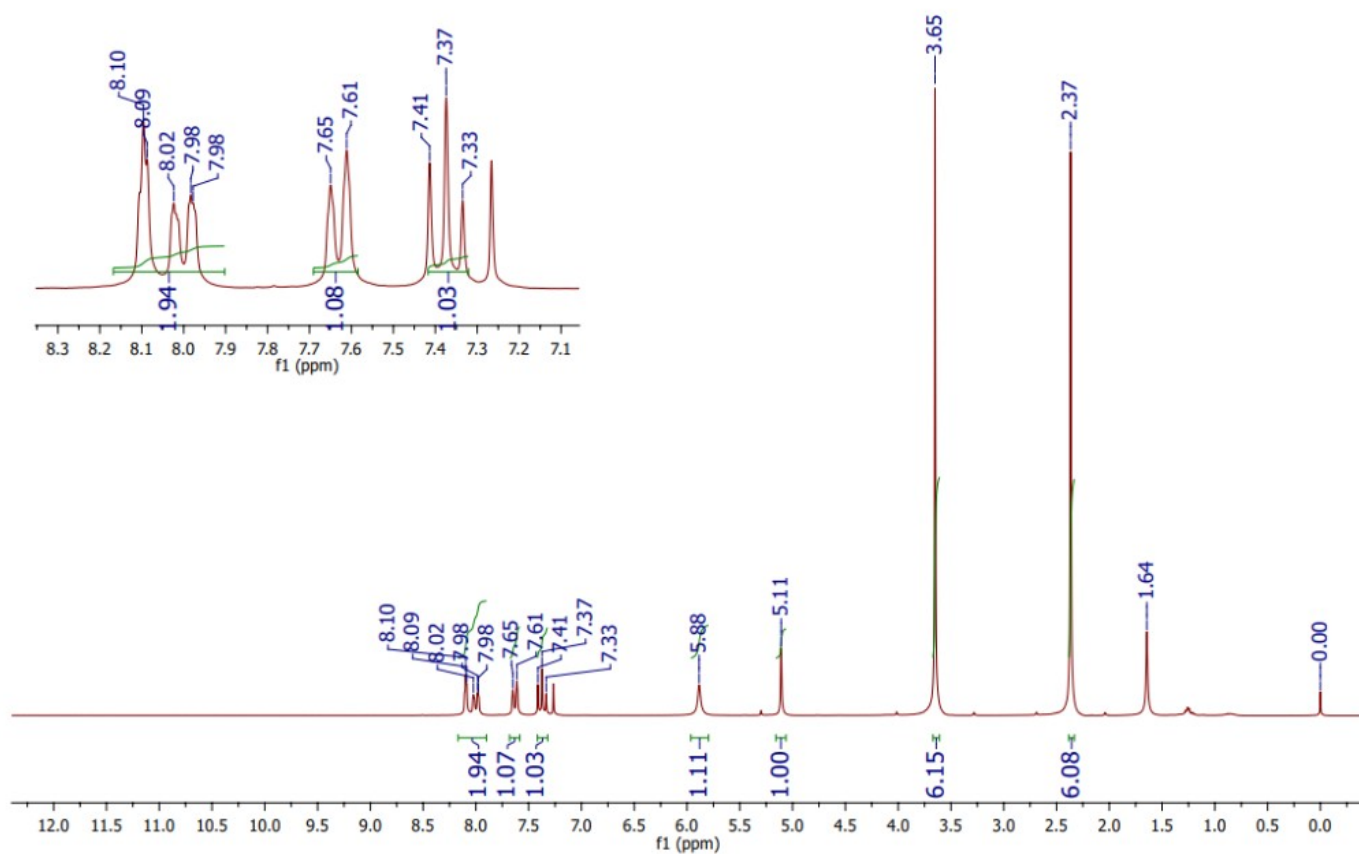


Figure S8. ¹H NMR (CDCl₃, 200 MHz) of dimethyl 1,4-dihydro-2,6-dimethyl-4-(3-nitrophenyl)-pyridine-3,5-dicarboxylate.

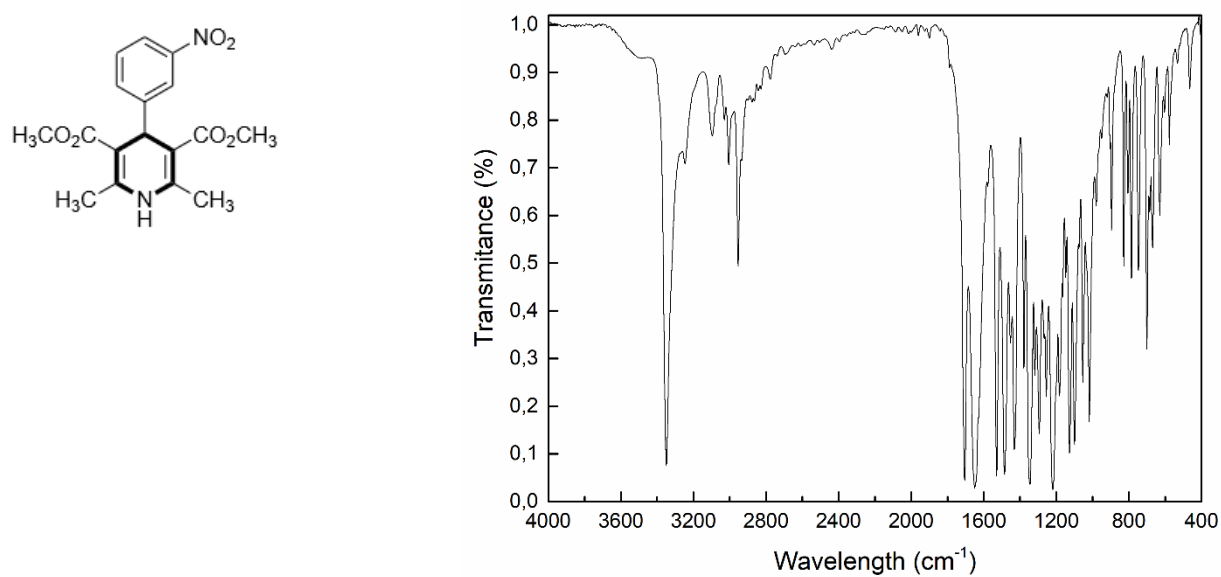


Figure S9. FT-IR spectrum of dimethyl 1,4-dihydro-2,6-dimethyl-4-(3-nitrophenyl)-pyridine-3,5-dicarboxylate.

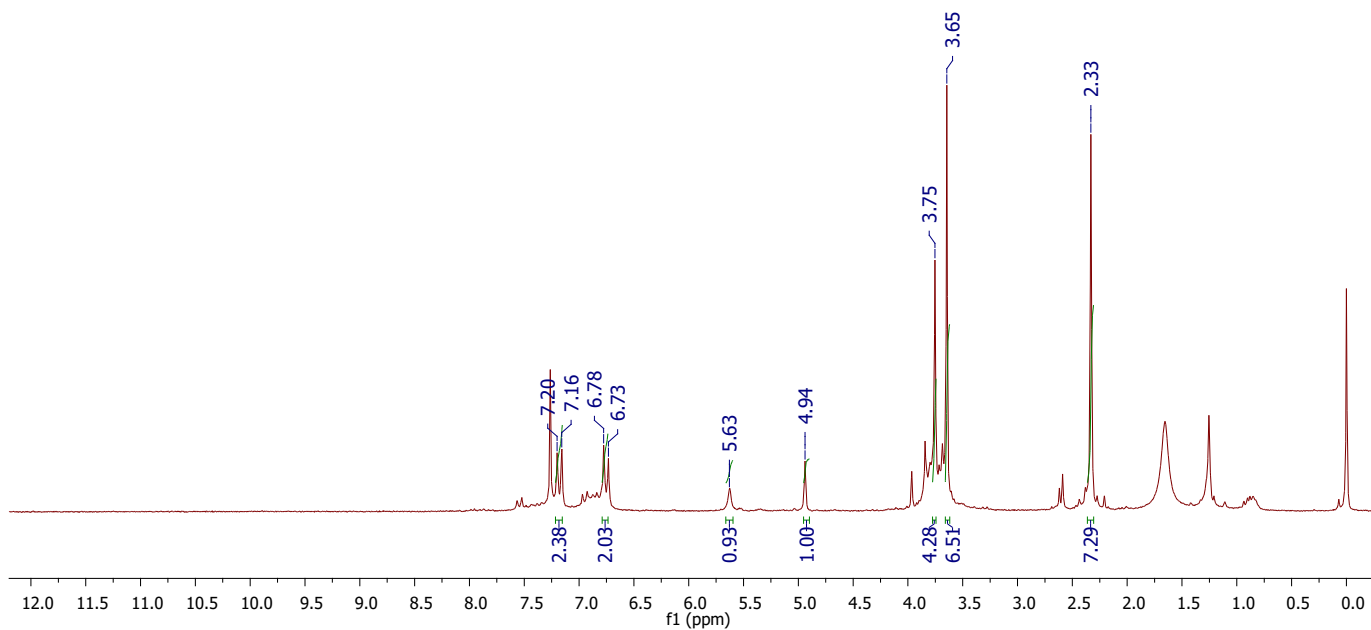


Figure S10. ^1H NMR (CDCl_3 , 200 MHz) of dimethyl 1,4-dihydro-2,6-dimethyl-4-(4-methoxyphenyl)-pyridine-3,5-dicarboxylate.

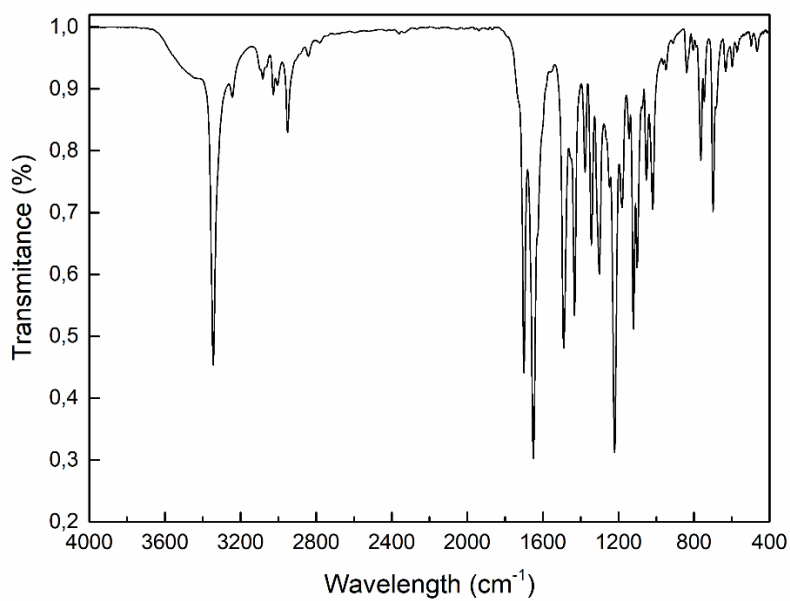
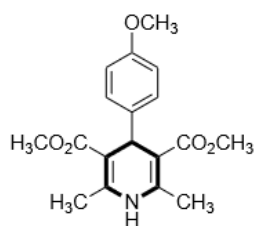


Figure S11. FT-IR spectrum of dimethyl 1,4-dihydro-2,6-dimethyl-4-(4-methoxyphenyl)-pyridine-3,5-dicarboxylate.

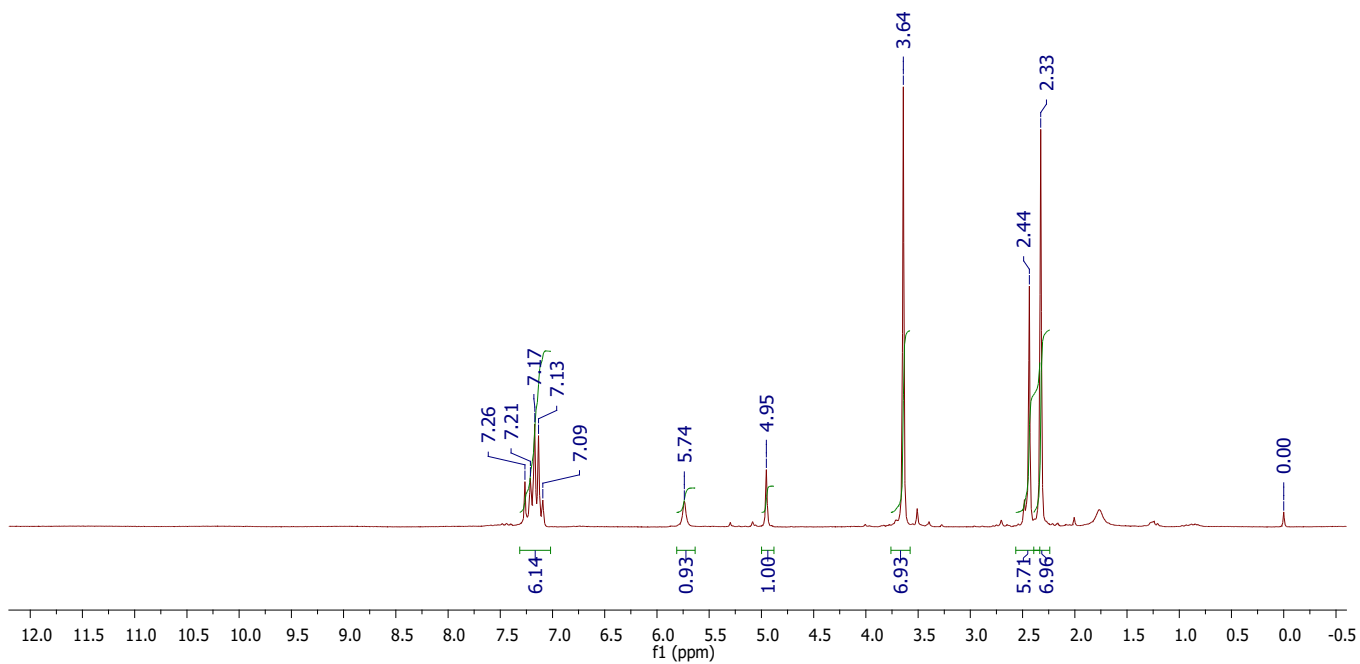


Figure S12. ^1H NMR (CDCl_3 , 200 MHz) of dimethyl 2,6-dimethyl-4-(4-(methylthio)phenyl)-1,4-dihydropyridine-3,5-dicarboxylate.

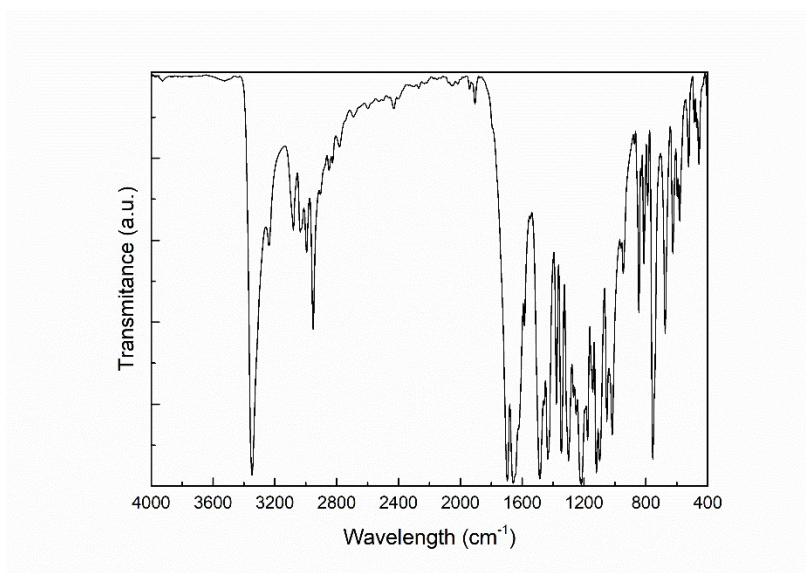
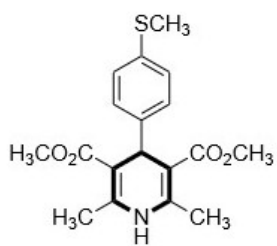


Figure S13. FT-IR spectrum of dimethyl 2,6-dimethyl-4-(4-(methylthio)phenyl)-1,4-dihydropyridine-3,5-dicarboxylate.

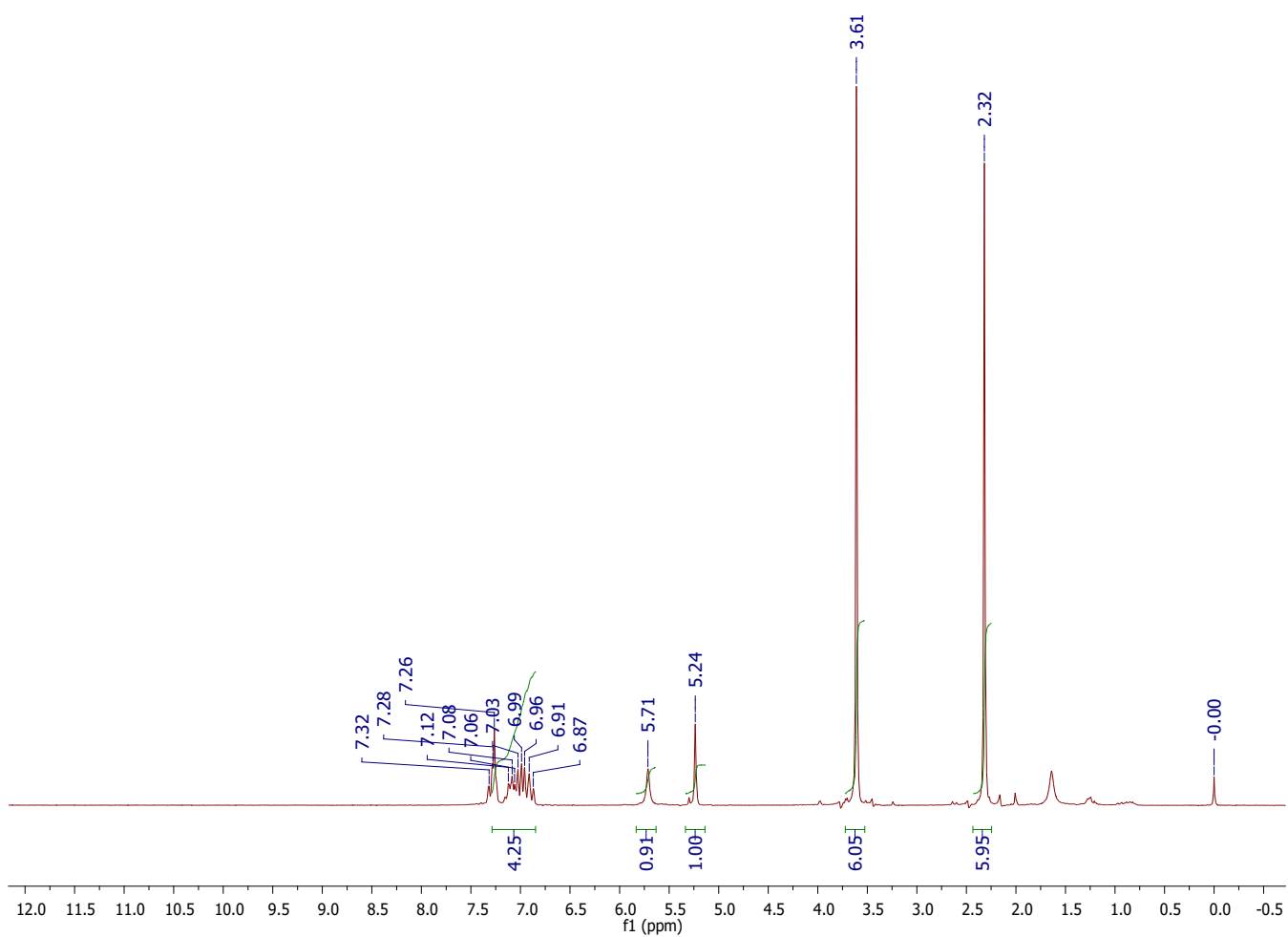


Figure S14. ^1H NMR (CDCl_3 , 200 MHz) of dimethyl 4-(2-fluorophenyl)-2,6-dimethyl-1,4-dihydropyridine-3,5-dicarboxylate.

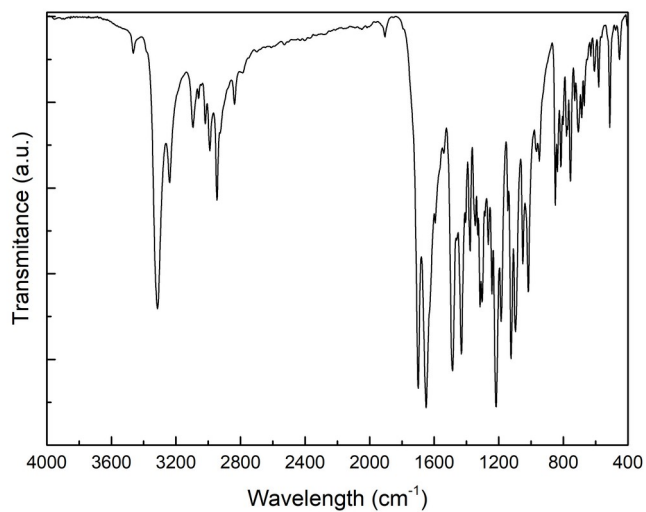
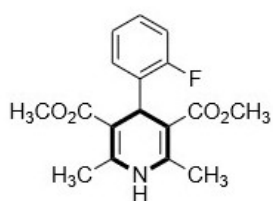


Figure S15. FT-IR spectrum of dimethyl 4-(2-fluorophenyl)-2,6-dimethyl-1,4-dihydropyridine-3,5-dicarboxylate.

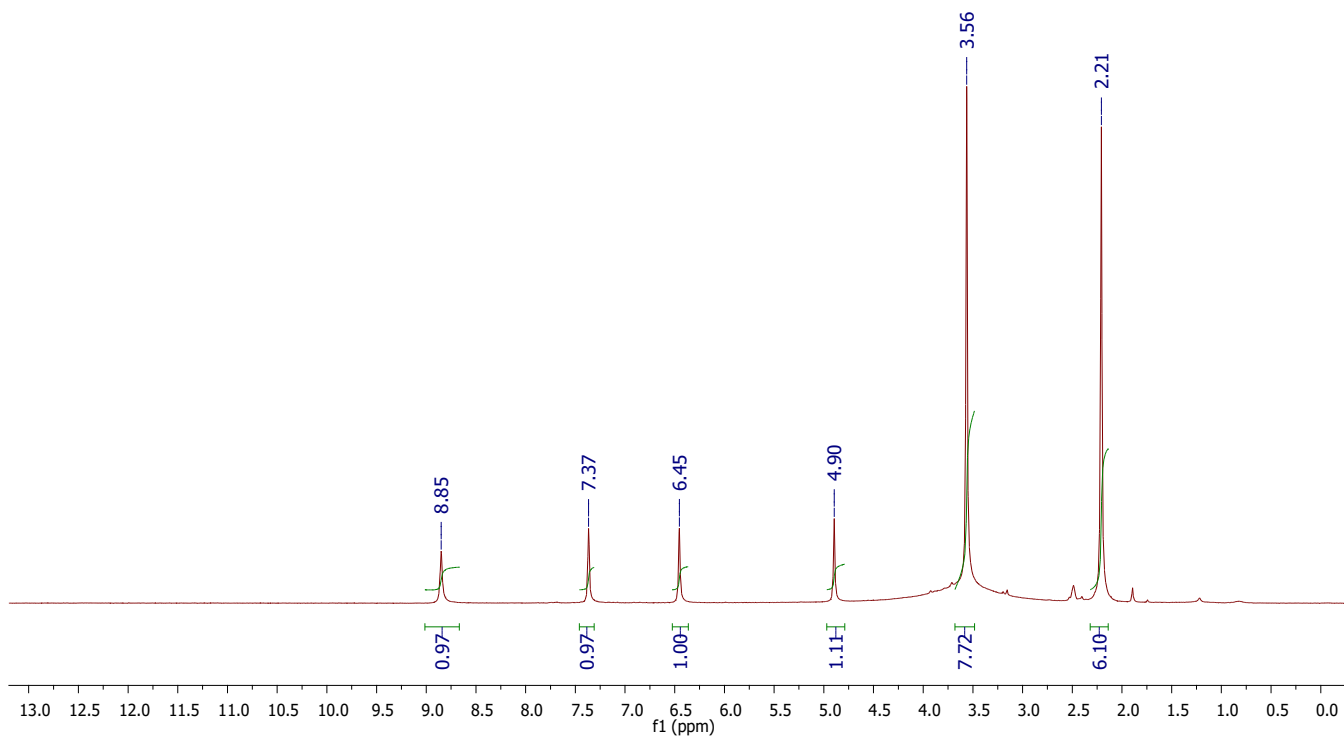


Figure S16. ^1H NMR (dms o - d_6 , 200 MHz) of dimethyl 4-(1*H*-imidazol-2-yl)-2,6-dimethyl-1,4-dihydropyridine-3,5-dicarboxylate.

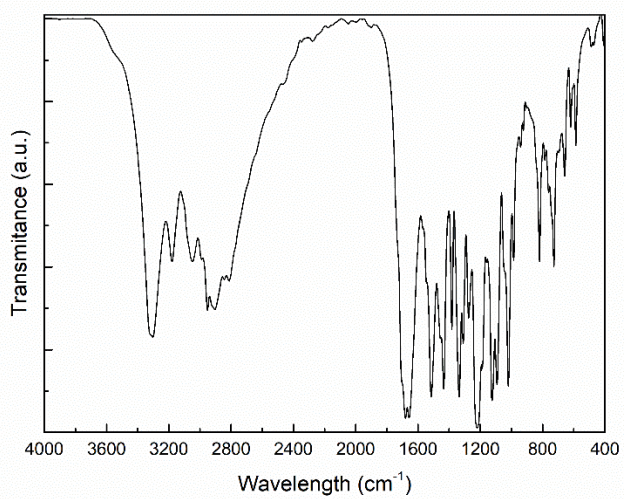
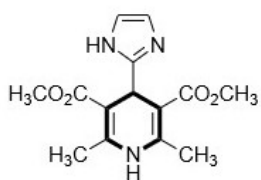


Figure S17. FT-IR spectrum of dimethyl 4-(1*H*-imidazol-2-yl)-2,6-dimethyl-1,4-dihydropyridine-3,5-dicarboxylate.