Supporting information

Ag/Pd bimetallic sites embedded in g-C_3N_4 nanosheets synergistically catalyze Suzuki coupling and nitroaromatic reduction reactions

Gongshu Wang[1]*, Aiye Shi[1], Nannan Wang[1], Feng Xue[1]* Jianshe Hu[2]*

[1]College of Chemistry and Chemical Engineering, Henan Institute of Science and Technology, Xinxiang, 453002, P.R. China.

[2]Center for Molecular Science and Engineering, College of Science, Northeastern University, Shenyang 110819, P. R. China.

Corresponding author E-mail: wanggongshu@hist.edu.cn (G.-S. Wang) and hujs@mail.neu.edu.cn (J.-S. Hu)

1. Materials

All reagents with AR purity (analytical reagent grade) were used as received with out further purification. Melamine, cyanuric acid, $PdCl_2$, $AgNO_3$, nitroaromatics, sodiu m borohydride ($NaBH_4$) were purchased from Beijing Innochem Science & Technology Co. LTD. acetonitrile, Ethanol, 1, 4-dioxane, methanol, tetrahydrofuran (THF), acetone, N, N-dimethylformamide (DMF), hydrochloric acid (HCl), anhydrous sodium sulfate (N a_2SO_4), petroleum ether, dichloromethane, ethyl acetate and sodium hydroxide (NaOH) were purchased from Shandong Fuyu Chemical Co. LTD.

2. Characterization

The X-ray diffraction patterns (XRD) were collected by an Empyrean diffractometer. Fourier transform infrared (FT-IR) spectra were tested with a PerkinElmer Spectrum One (B) spectrometer in the wavelength region of 4000-500 cm^{-1}. The transmission electron microscopic (TEM) images were obtained by JEM2100PLUS instruments. ICP-OES: Thermo Fisher iCAP PRO. The Scanning electron microscopy (SEM) images were recorded by scan electronic microscopy (SU8010). X-ray photoelectron spectroscopy (XPS) was used to probe the surface composition of samples using ESCALAB250. ^1H NMR spectra were performed

on a Bruker ARX 600 high-resolution NMR spectrometer.

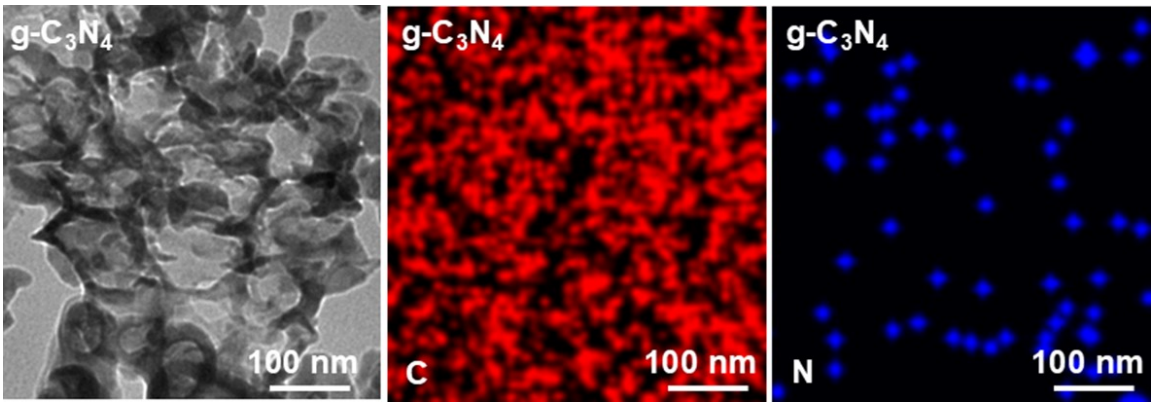


Figure S1. The representative TEM image of g-C_3N_4

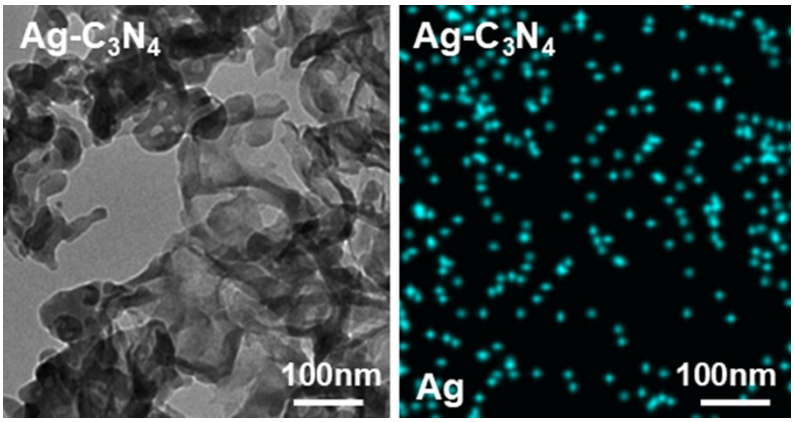


Figure S2. The representative TEM image of Ag-C_3N_4

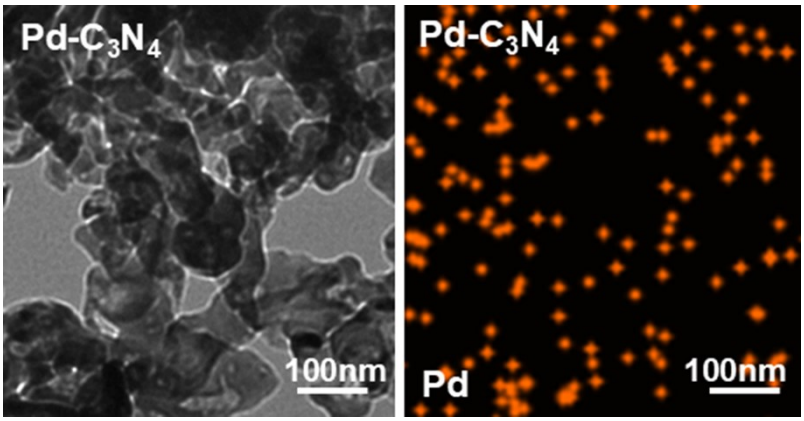


Figure S3. The representative TEM image of Pd-C_3N_4

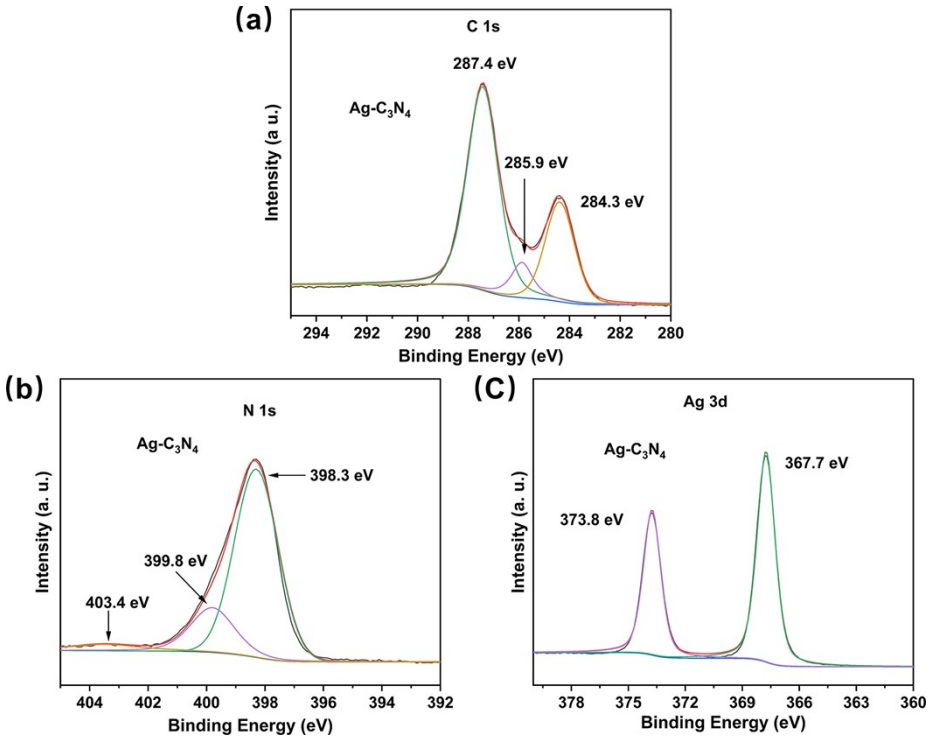


Figure S4 (a) C 1s, (b) N 1s, (c) Ag 3d spectra of Ag-C_3N_4.

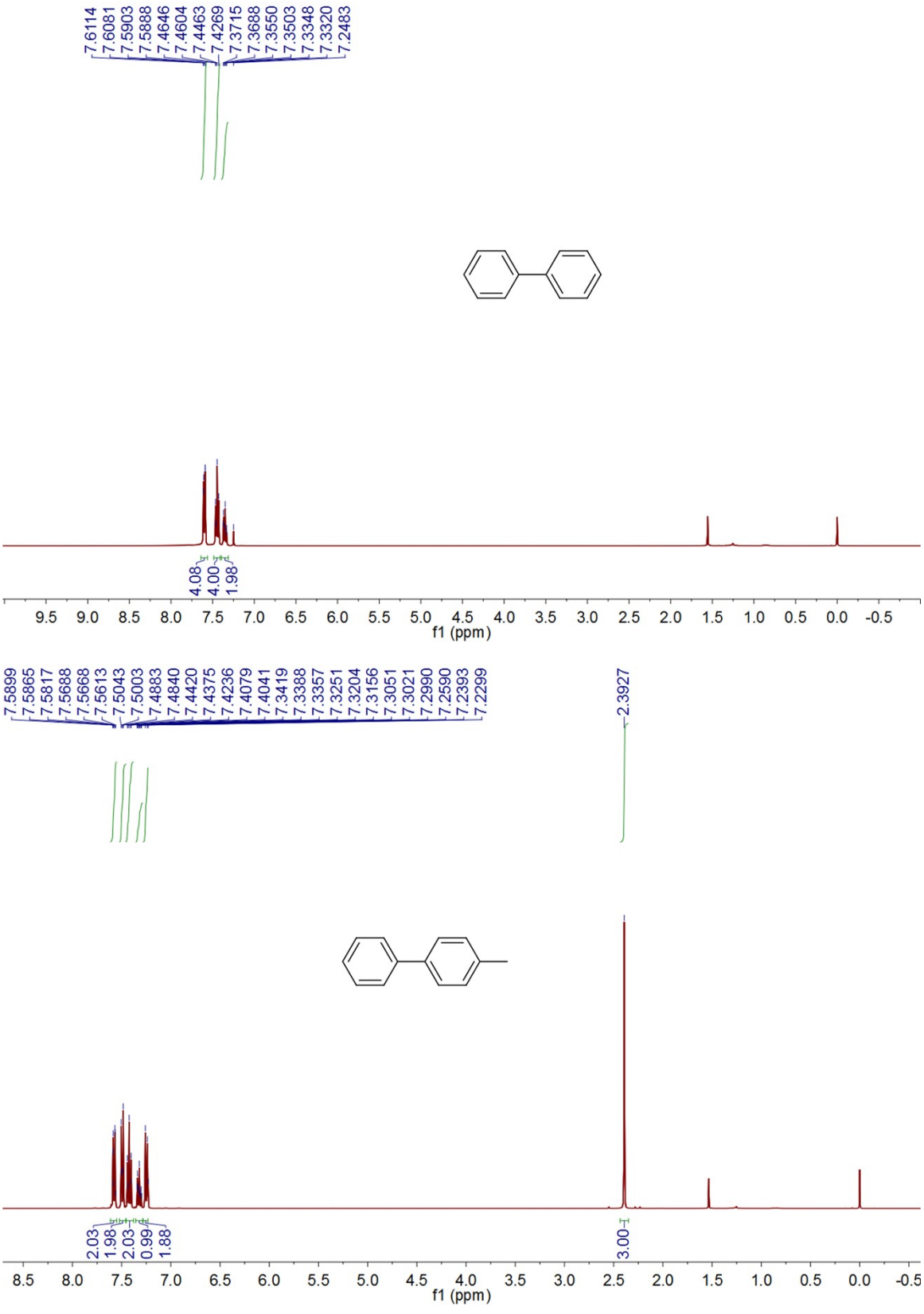
Table S1 Silver and palladium content in unused AgPd-g-C_3N_4 catalyst.

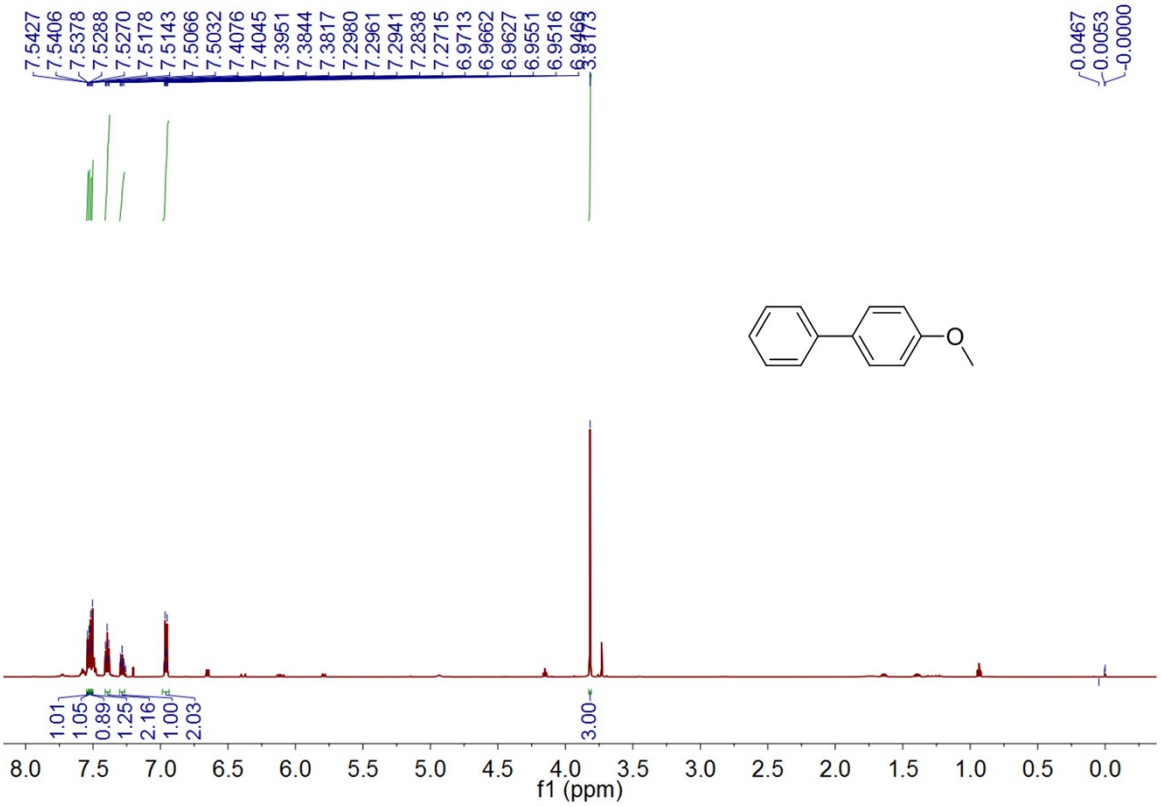
Entry	sample quantity	Constant Volume V_0（mL)	Test Element	Element concentration Co（mg/L)	Dilution ratio f	Element concentration in digestion solution C1（mg/L)	Elemental Content of Samples Cx（mg/kg)	Elemental Content of Samples W（%)
1	0.03237	25	Ag	11.113	10	111.130	85827.93	8.583
2	0.0353	25	Pd	4.097	10	40.970	29015.58	2.902

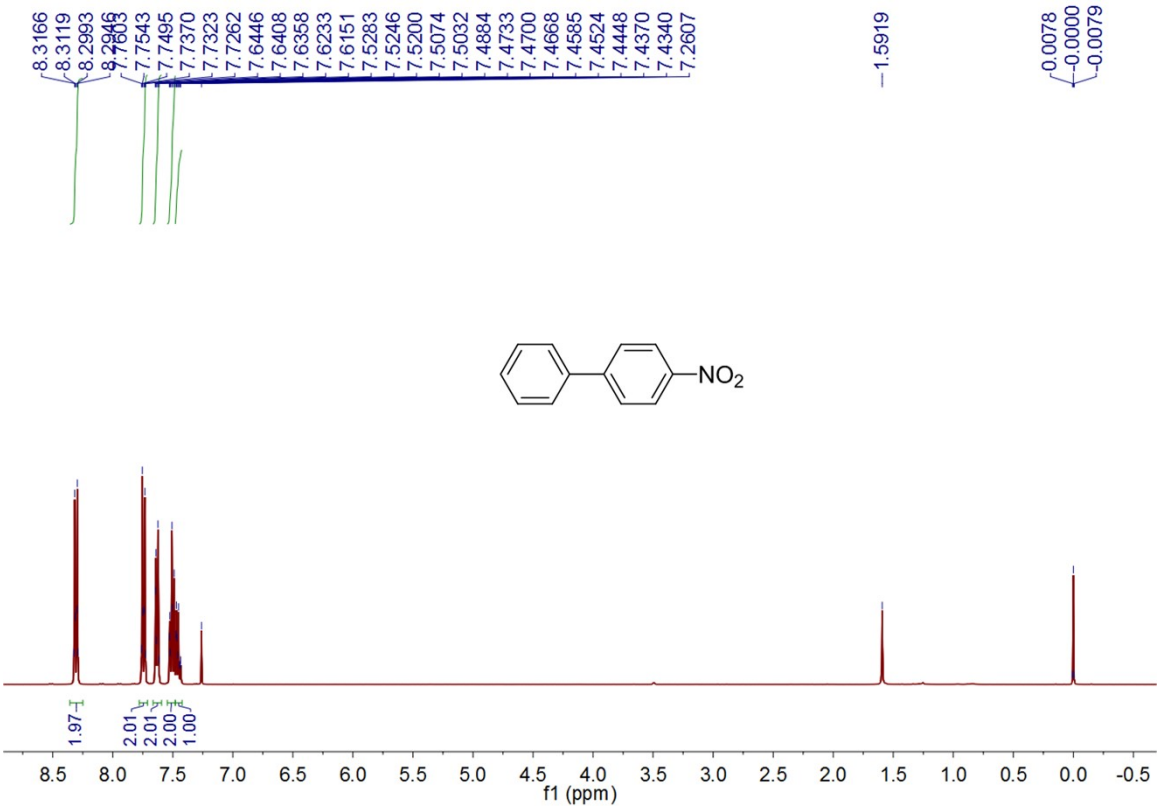
Table S2 Silver and palladium content in the AgPd-g-C_3N_4 catalyst after 8 recycling cycles

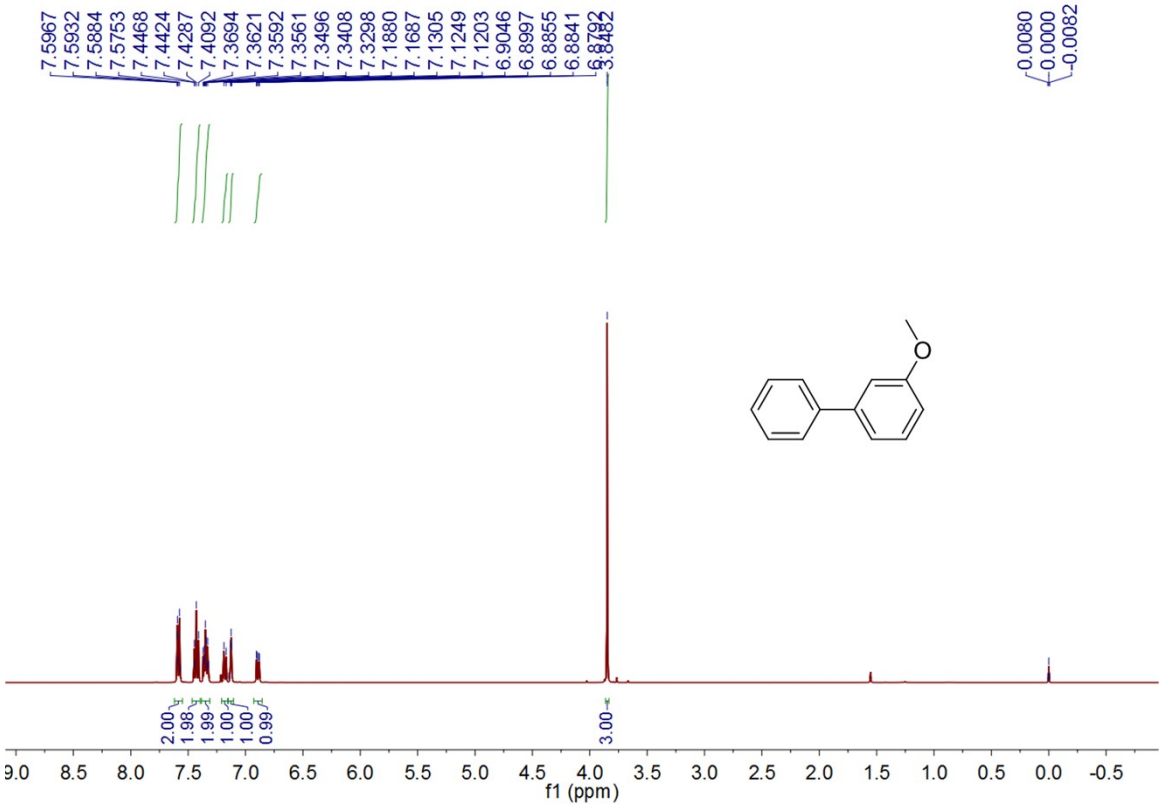
Entry	sample quantity	Constant Volume V_0（mL)	Test Element	Element concentration Co（mg/L)	Dilution ratio f	Element concentration in digestion solution C1（mg/L)	Elemental Content of Samples Cx（mg/kg)	Elemental Content of Samples W（%)
1	0.04325	25	Ag	14.586	10	145.860	84312.14	8.431

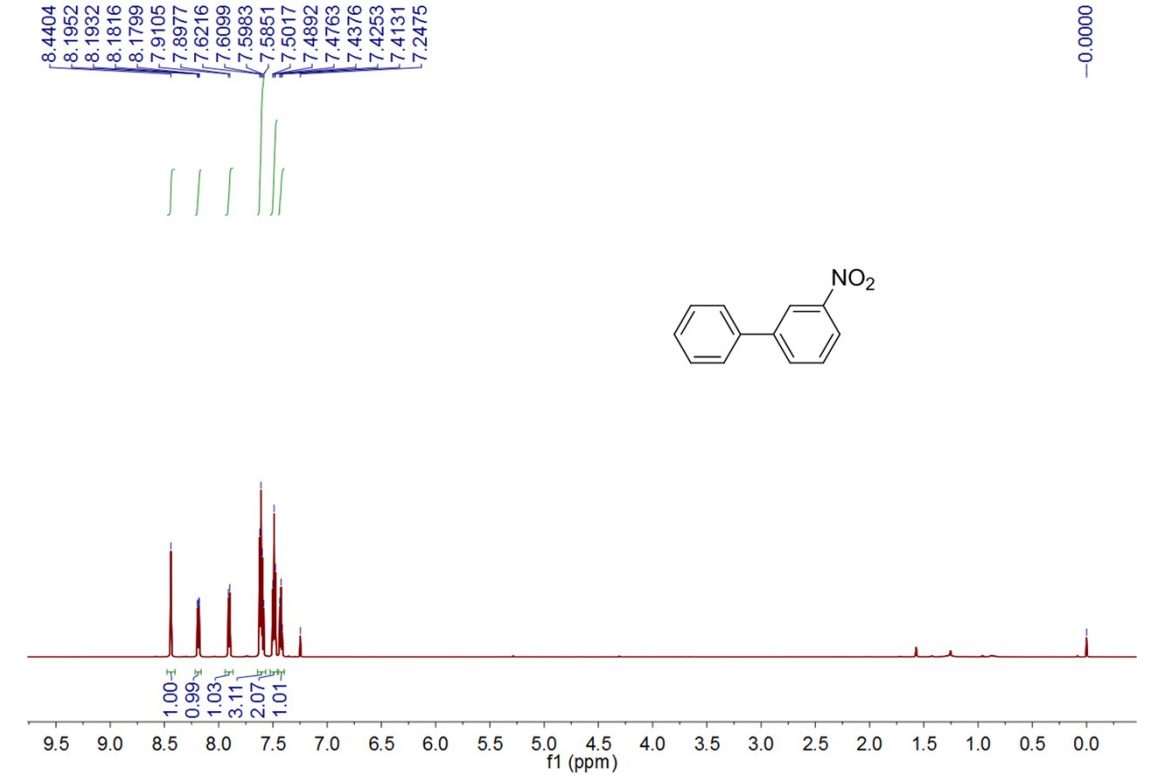
[1]H NMR spectra of Suzuki coupling reaction products.

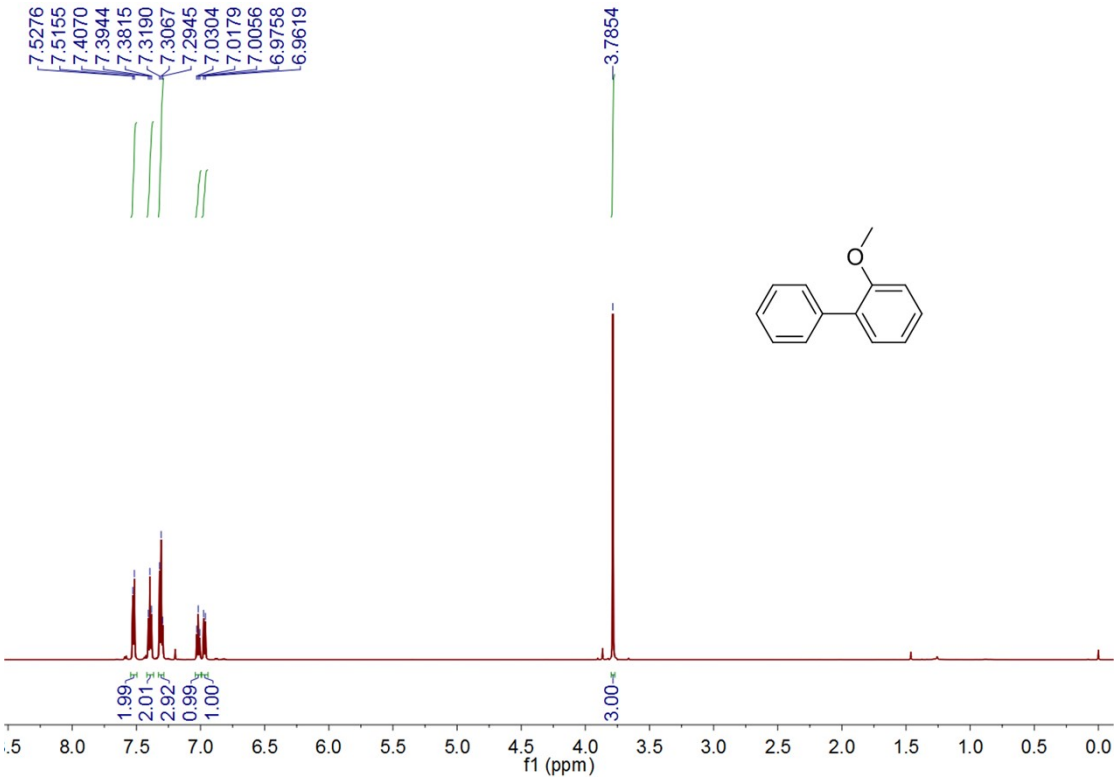



7.5427
7.5406
7.5378
7.5288
7.5270
7.5178
7.5143
7.5066
7.5032
7.4076
7.4045
7.3951
7.3844
7.3817
7.2980
7.2961
7.2941
7.2838
7.2715
6.9713
6.9662
6.9627
6.9551
6.9516
3.8173
0.0467
-0.0053
-0.0000
O
1.01
1.05
0.89
1.25
2.16
1.00
2.03
3.00
8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)


8.3166
8.3119
8.2993
7.7543
7.7495
7.7370
7.7323
7.7262
7.6446
7.6408
7.6358
7.6233
7.6151
7.5283
7.5246
7.5200
7.5074
7.5032
7.4884
7.4733
7.4700
7.4668
7.4585
7.4524
7.4448
7.4370
7.4340
7.2607
1.5919
0.0078
-0.0000
-0.0079
NO2
1.97
2.01
2.01
2.00
1.00
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)


7.5967
7.5932
7.5884
7.5753
7.4468
7.4424
7.4287
7.4092
7.3694
7.3621
7.3592
7.3561
7.3496
7.3408
7.3298
7.1880
7.1687
7.1305
7.1249
7.1203
6.9046
6.8997
6.8855
6.8841
3.8482
0.0080
0.0000
-0.0082
O
2.00
1.98
1.99
1.00
1.00
0.99
3.00
f1 (ppm)


8.4404
8.1952
8.1932
8.1816
8.1799
7.9105
7.8977
7.6216
7.6099
7.5983
7.5851
7.5017
7.4892
7.4763
7.4376
7.4253
7.4131
7.2475
0.0000
NO2
1.00
0.99
1.03
3.11
2.07
1.01
f1 (ppm)


7.5276
7.5155
7.4070
7.3944
7.3815
7.3190
7.3067
7.2945
7.0304
7.0179
7.0056
6.9758
6.9619
3.7854
O
1.99
2.01
2.92
0.99
1.00
3.00
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)