Supporting Information

Amine-functionalized MIL-101(Cr) embedded with Co(II) phthalocyanine as a durable catalyst for one-pot tandem oxidative A^3 coupling reactions of alcohols

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Spectral data:

All of the products are known compounds and were reported previously.[1]

1-(1,3-Diphenylprop-2-yn-1-yl)piperidine (5a)

Yellow oil (0.250 g, 91%): ^{1}H NMR (300.13 MHz, $CDCl_3$) δ: 1.35-1.50 (2H, m, CH_2), 1.55-1.77 (4H, m, $2CH_2$), 2.57-2.60 (4H, m, $2CH_2$), 4.82 (1H, s, $CH_{benzylic}$), 7.31-7.67 (10H, m, H_{arom}).

1-(3-Phenyl-1-(p-tolyl)prop-2-yn-1-yl)pyrrolidine (5d)

Yellow oil (0.236 g, 86%): ^{1}H NMR (300.13 MHz, $CDCl_3$) δ: 1.84 (4H, br s, $2CH_2$), 2.38 (3H, s, CH_3), 2.76 (4H, br s, $2CH_2$), 4.93 (1H, s, $CH_{benzylic}$), 7.19-7.55 (9H, m, H_{arom}).

4-(3-Phenyl-1-(p-tolyl)prop-2-yn-1-yl)morpholine (5e)

Yellow oil (0.241 g, 83%): ^{1}H NMR (300.13 MHz, $CDCl_3$) δ: 2.38 (3H, s, CH_3), 2.64 (4H, br s, $2CH_2$), 3.72 (4H, 2H, br s, $2CH_2$), 4.76 (1H, s, $CH_{benzylic}$), 7.13-7.53 (9H, m, H_{arom}).

4-(1-(4-Methoxyphenyl)-3-phenylprop-2-yn-1-yl)morpholine (5g)

Yellow oil (0.267 g, 87%): ^{1}H NMR (300.13 MHz, $CDCl_3$) δ: 2.63 (4H, br s, $2CH_2$), 3.74 (4H, 2H, br s, $2CH_2$), 3.83 (3H, s, OCH_3), 4.74 (1H, s, $CH_{benzylic}$), 6.90-7.62 (9H, m, H_{arom}).

References

1. a) G. Bosica, J. Gabarretta, *RSC Adv.* 2015, **5**, 46074-46087, b) N. Hussain, M. R. Das, *New J. Chem* 2017, **41**,12756-12766, c) J. Rosales, J. M. Garcia, E. Ávila, T. González, D. S. Coll, E. Ocando-Mavárez, *Inorganica Chim. Acta* 2017, **467**, 155-162, d) J. Safaei-Ghomi, S. H. Nazemzadeh, *Catal. Lett.* 2017, 1-8, e) Y. Zhang, A. M. Santos, E. Herdtweck, J. Mink, F. E. Kühn, *New J. Chem* 2005, **29**, 366-370.

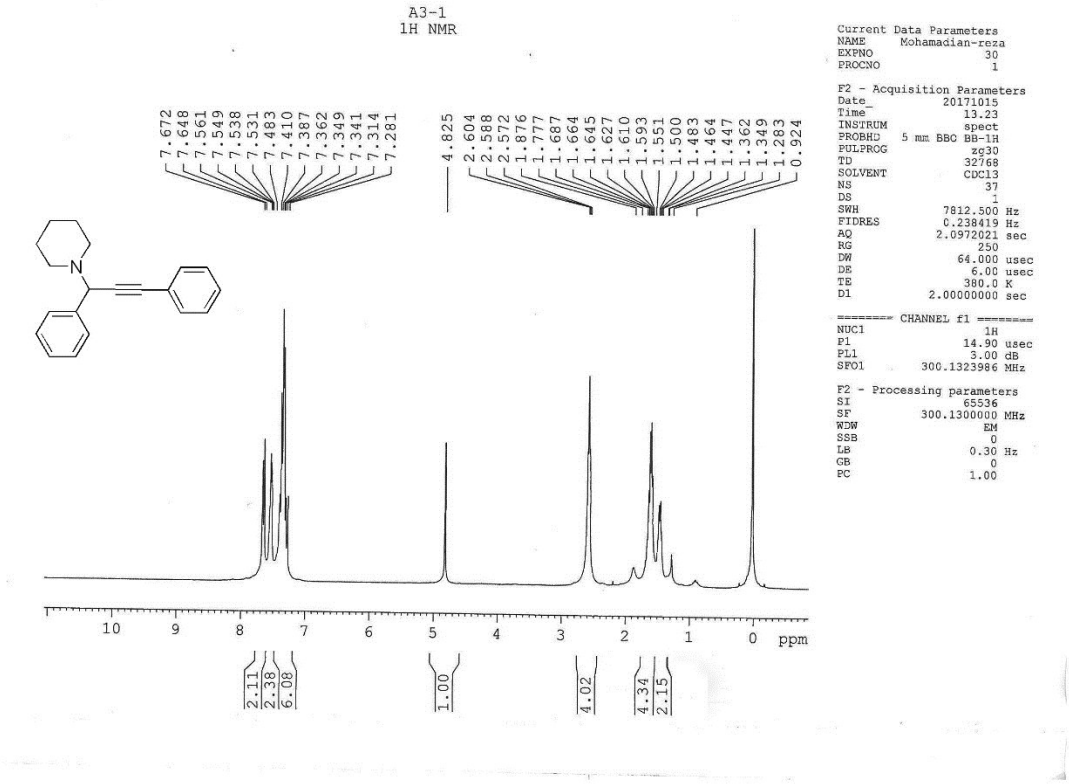

Figure 1. [1]H NMR spectrum of 1-(1,3-diphenylprop-2-yn-1-yl)piperidine (**5a**).

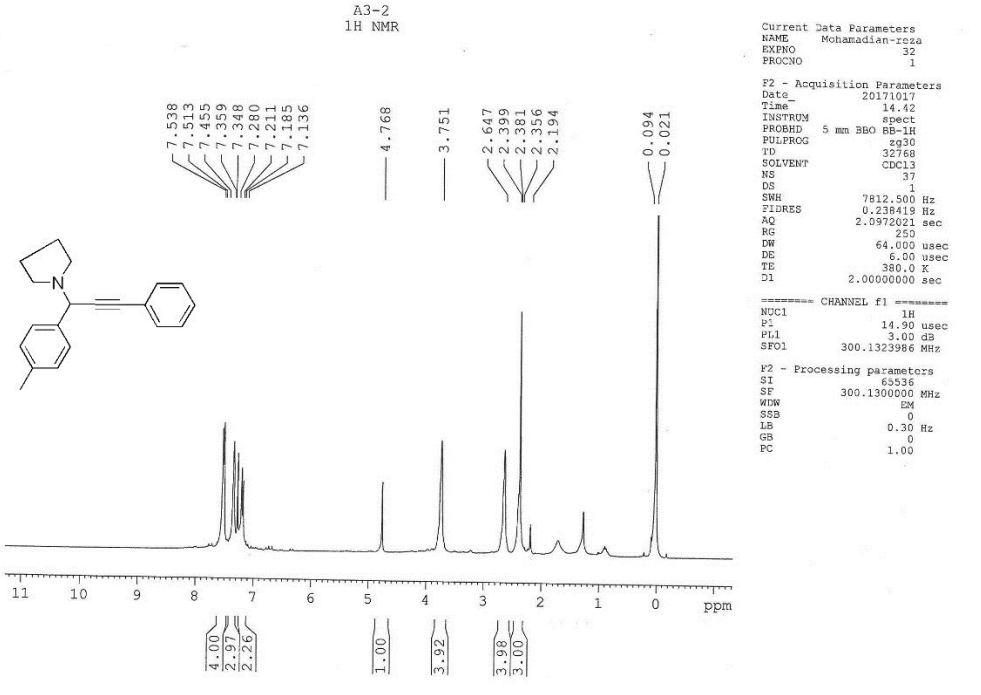

Figure 2. [1]H NMR spectrum of 1-(3-phenyl-1-(p-tolyl)prop-2-yn-1-yl)pyrrolidine (**5d**).

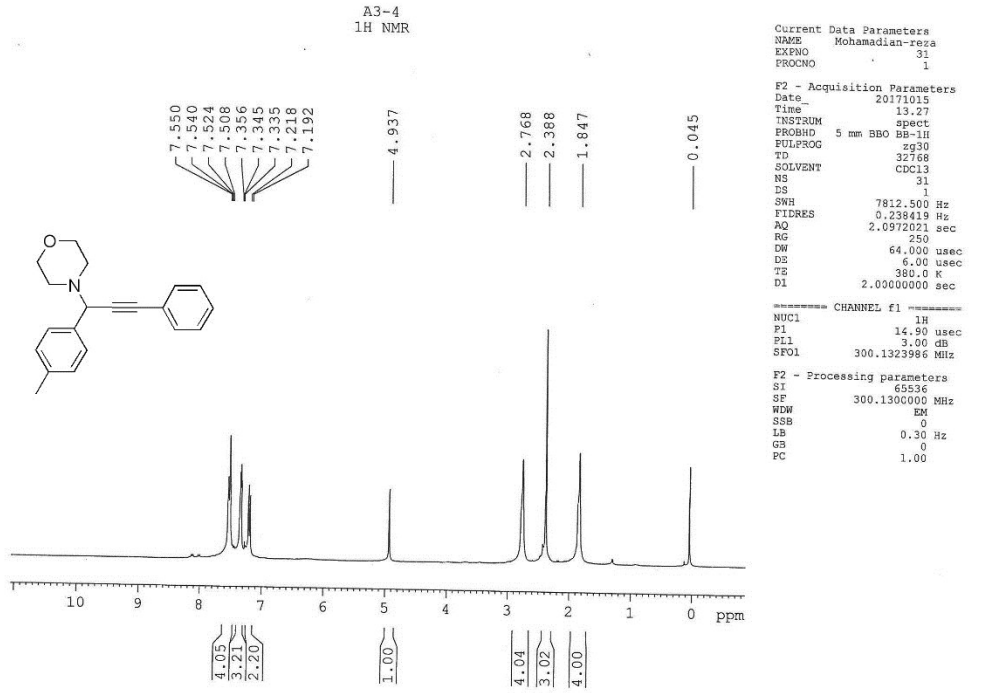

Figure 3. [1]H NMR spectrum of 4-(3-phenyl-1-(p-tolyl)prop-2-yn-1-yl)morpholine (**5e**).

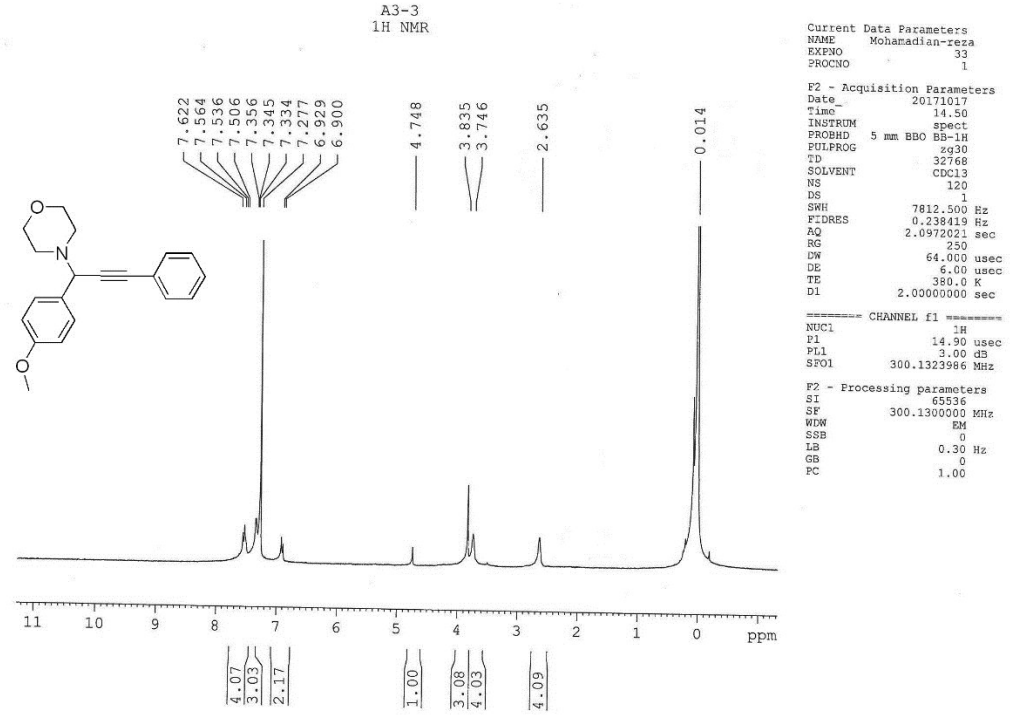

Figure 4. [1]H NMR spectrum of 4-(1-(4-methoxyphenyl)-3-phenylprop-2-yn-1-yl)morpholine (**5g**).