Electronic Supporting Information
For

Tetragonal Cu_2Se nanoflakes: Synthesis using selenated propylamine as Se source and activation of Suzuki and Sonogashira cross coupling reactions

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S1. SEM and EDX analysis

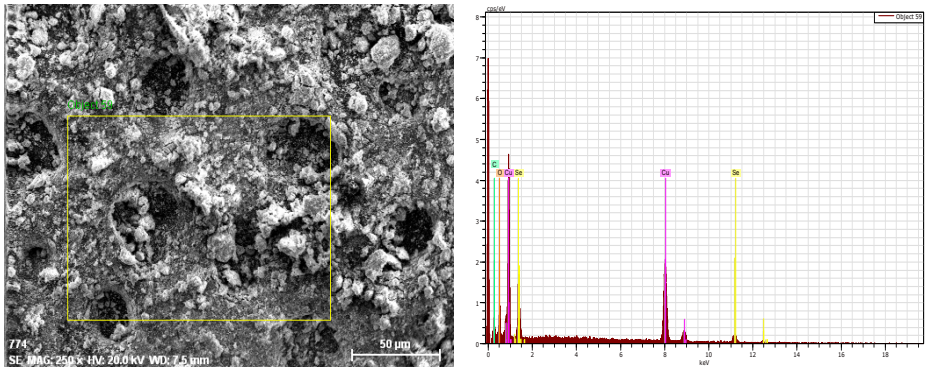
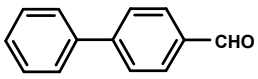


Fig. S1 SEM image and EDX analysis of Cu_2Se nanoflakes.

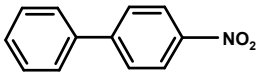
S2. Spectroscopic data of coupled products of Suzuki cross coupling reactions[1]

1. **4−Phenylbenzaldehyde** (light yellow solid)



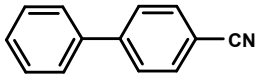
^{1}H NMR (300 MHz, $CDCl_3$): δ 7.551 (m, 3H), 7.689 (m, 2H), 7.820 (d, J = 8.4 Hz, 2H), 7.953 (d, J = 7.2 Hz, 2H), 9.971 (s, 1H). (Table 3, Entry 1b)

2. **4-Nitrobiphenyl (**Pale yellow solid)



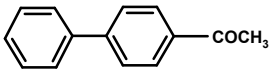
^{1}H NMR (300 MHz, $CDCl_3$): δ 7.463 (m, 3H), 7.664 (d, J = 8.4 Hz, 2H), 7.692 (d, J = 8.4 Hz, 2H), 8.105 (d, J = 8.7 Hz, 2H). (Table 3, Entry 2b)

3. **4-Phenylbenzonitrile** (pale yellow solid)



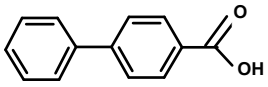
^{1}H NMR (300 MHz, $CDCl_3$): δ 7.397−7.370 (m, 3H, aromatic), 7.478−7.416 (m, 2H, aromatic), 7.544−7.529 (m, 4H, aromatic). (Table 3, Entry 3b)

4. **4−Acetylbiphenyl** (white solid)



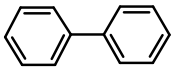
^{1}H NMR (300 MHz, $CDCl_3$): δ 2.619 (s, 3H), 7.387−7.346 (m, J = 8.1Hz 3H), 7.468 (t, 2H), 7.637−7.622 (m, 2H), 7.853 (d, J = 8.5 Hz 2H). (Table 3, Entry 4b)

5. **Biphenyl-4-carboxylic acid (**White solid)



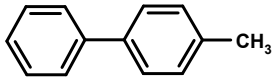
^{1}H NMR (300 MHz, DMSO): δ 7.391−7.471 (m, 3H), 7.731 (d, J = 7.5 Hz, 2H), 7.786 (d, J = 8.5 Hz, 2H), 8.051 (d, J = 8.3 Hz, 2H) (Table 3, Entry 5b)

6. **Biphenyl** (white solid)



^{1}H NMR (300 MHz, $CDCl_3$): δ 7.364 (t, J = 7.8 Hz, 2H), 7.491 (t, J = 7.7 Hz, 4H), 7.793 (d, J = 7.9 Hz, 4H). (Table 3, Entry 6b)

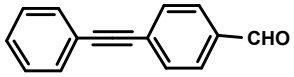
7. **4-Methylbiphenyl (**colorless solid)



^{1}H NMR (300 MHz, $CDCl_3$): δ 2.341 (s, 3H), 7.248 (d, 2H), 7.286−7.271 (m, 1H), 7.409−7.414 (m, 2H), 7.492 (d, J = 8.8 Hz, 2H), 7.653−7.641 (m, 2H). (Table 3, Entry 7b)

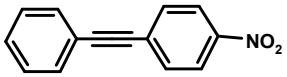
S3. Spectroscopic data of coupled products of Sonogashira cross coupling reactions[2]

1. **4-(phenylethynyl)benzaldehyde** (light yellow solid)



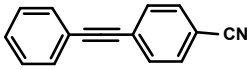
^{1}H NMR (300 MHz, $CDCl_3$): δ 7.243−7.387 (m, 3H), 7.583−7.505 (m, 2H), 7.680 (d, J = 8.4 Hz, 2H), 7.845 (d, J = 8.1 Hz, 2H), 9.959 (s, 1H). (Table 3, Entry 1c)

2. **1-Nitro-4-(phenylethynyl)benzene** (yellow solid)



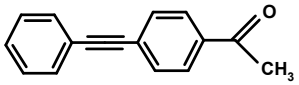
^{1}H NMR (300 MHz, $CDCl_3$): δ 7.374 – 7.275 (m, 3H), 7.532 (m, 2H), 7.670 (d, J = 8.8 Hz, 2H), 8.111 (d, J = 8.8 Hz, 2H). (Table 3, Entry 2c)

3. **4-(phenylethynyl)benzonitrile** (light yellow solid)



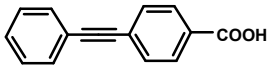
^{1}H NMR (300 MHz, $CDCl_3$): δ 7.289−7.257 (m, 2H), 7.412−7.366 (m, 2H), 7.479 (d, J = 7.5 Hz, 2H), 7.494 (d, J = 7.5 Hz, 2H). (Table 3, Entry 3c)

4. **4-(phenylethynyl)acetophenone** (white solid)



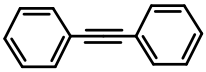
^{1}H NMR (300 MHz, $CDCl_3$): δ 2.061 (s, 3H), 7.22 (m, 3H), 7.385 (d, J = 8.5 Hz, 2H), 7.557 (m, 2H), 7.636 (d, J = 8.5 Hz, 2H). (Table 3, Entry 4c)

5. **4-(phenylethynyl)benzoic acid (**White solid)



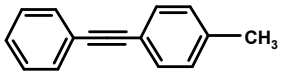
^{1}H NMR (300 MHz, DMSO-d, δ ppm): 13.18 (s, 1H), 7.391−7.372 (m, 3H), 7.571−7.559 (m, 2H), 7.674 (d, J = 4.8 Hz, 2H), 7.961 (d, J = 5.7 Hz, 2H). (Table 3, Entry 5c)

6. **1,2 Diphenylethyne** (white solid)



^{1}H NMR (300 MHz, $CDCl_3$): δ 7.407−7.358 (m, 6H), 7.569−7.555 (d, 4H). (Table 3, Entry 6c)

7. **1-Methyl-4-(phenylethynyl) benzene (**colorless solid)



^{1}H NMR (300 MHz, $CDCl_3$): δ 2.336 (s, 3H), 7.089 (d, J = 7.5 Hz, 2H), 7.235 (d, J = 7.7 Hz, 2H), 7.397 (d, J = 7.1 Hz, 3H), 7.579 (d, 2H), (Table 3, Entry 7c)

S4. References:

1. (a) J. Yang, D. Wang, W. Liu, Xi Zhang, F. Bian, W. Yu, *Green Chem*., 2013, **15**, 3429–3437; (b) V. V. Singh, U. Kumar, S. N. Tripathi and A. K. Singh, *Dalton Trans*., 2014, **43**, 12555–12563; (c) G. K. Rao, A. Kumar, J. Ahmed and A. K. Singh, *Chem. Commun*., 2010, **46**, 5954–5956; (d) N. Sakai, N. Takahashi, D. Inoda, R. Ikeda and T. Konakahara, *Molecules* 2013, **18**, 12488–12499.

2. (a) A. Elangovan, Y-H Wang, and T-I Ho, *Org. Lett.,* 2003, **5**, 1841–1844; (b) H. Huang, H. Jiang, K. Chen, and H. Liu, *J. Org. Chem*. 2008, **73**, 9061–9064; (c) S. Thorand and N. Krause, *J. Org. Chem*. 1998, **63**, 8551–8553; (d) M. Maity and U. Maitra, *J. Mat. Chem. A*, Accepted Manuscript, DOI: 10.1039/c0xx00000x; (e) Y-S Feng , X-Y Lin , J, Haob , H-J Xu, *Tetrahedron* 2014, **70**, 5249–5253; (f) X-Y Zhu, Y, Wang, F, Bai, G-W Gao, and J, Men, *ARKIVOC,* 2011, **10**, 99–106.