

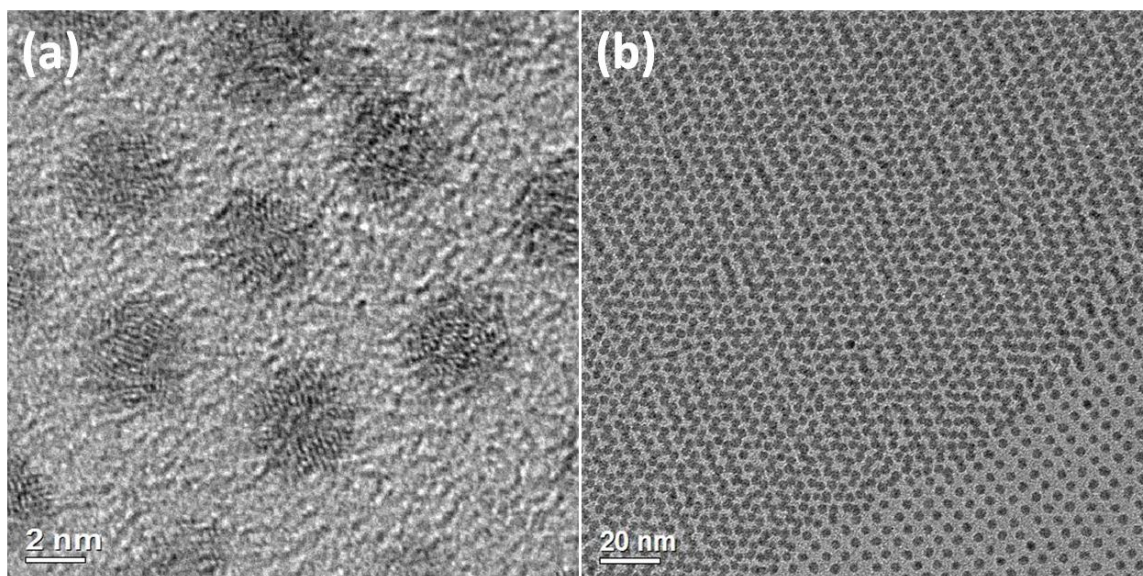
## Electronic Supplementary Information

### Surface Ligand Mediated Growth of CuPt Nanorods

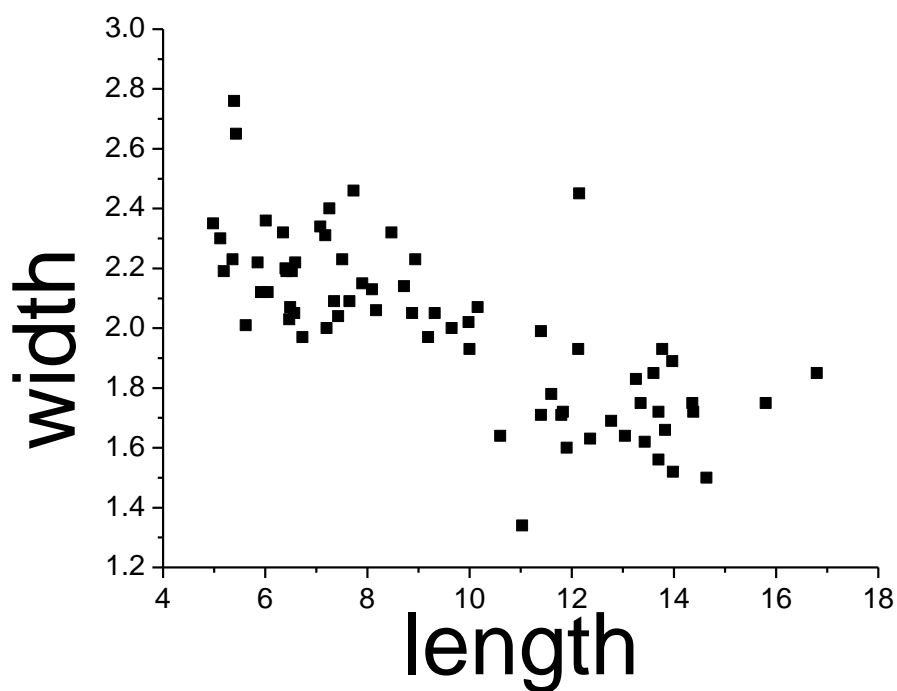
Fengjiao Yu, Xiaoxiang Xu, Christopher J. Baddeley, Ronan M. Bellabarba, Pascal Lignier, Robert P. Tooze, John S. T. Irvine and Wuzong Zhou

**Table S1** Experiment conditions of the synthesis of CuPt nanorods. T: reaction time; Amine: hexadecylamine; Acid: hexadecanoic acid; L: Dimension of nanoparticles, length of nanorods or diameter of nanospheres; C8: octylamine and octanoic acid; C12: dodecylamine and dodecanoic acid; C18: octadecylamine and stearic acid.

Sample Amine:acid	T (h)	Amine (mmol)	Acid (mmol)	Molar ratio Metal:Amine: Acid	L (nm)
1 : 1	0.5	1.8	1.8	1 : 9 : 9	15.7 (rods) 2.8 (spheres)
1 : 1.5	0.5	1.8	2.7	1 : 9 : 13.5	11.7 (rods)
1.5 : 1	0.5	2.7	1.8	1 : 13.5 : 9	24.3 (rods)
1.5 : 1.5	0.5	2.7	2.7	1 : 13.5 : 13.5	24.0 (rods)
0.5 : 0.5	0.5	0.9	0.9	1 : 4.5 : 4.5	2.0 (spheres)
2 : 1	0.5	3.6	1.8	1 : 18 : 9	28.9 (rods)
1 : 1 (2-step)	0.5	1.8	1.8	1 : 9 : 9	Strands of nanowires
1.5 : 1 (2-step)	2	2.7	1.8	1 : 13.5 : 9	Strands of nanowires
1.5: 1.5 (2 step)	0.5	2.7	2.7	1 : 13.5 : 13.5	nanorods
2 : 1 at 160°C (2-step)	2	3.6	1.8	1 : 18 : 9	nanospheres
Double decanediol	0.5	1.8	1.8	1 : 9 : 9	15.6 (rods)
1 : 1 C8	0.5	1.8	1.8	1 : 9 : 9	9.5 (rods)
1 : 1 C12	0.5	1.8	1.8	1 : 9 : 9	11.4 (rods)
1 : 1 C18	0.5	1.8	1.8	1 : 9 : 9	15.2 (rods)

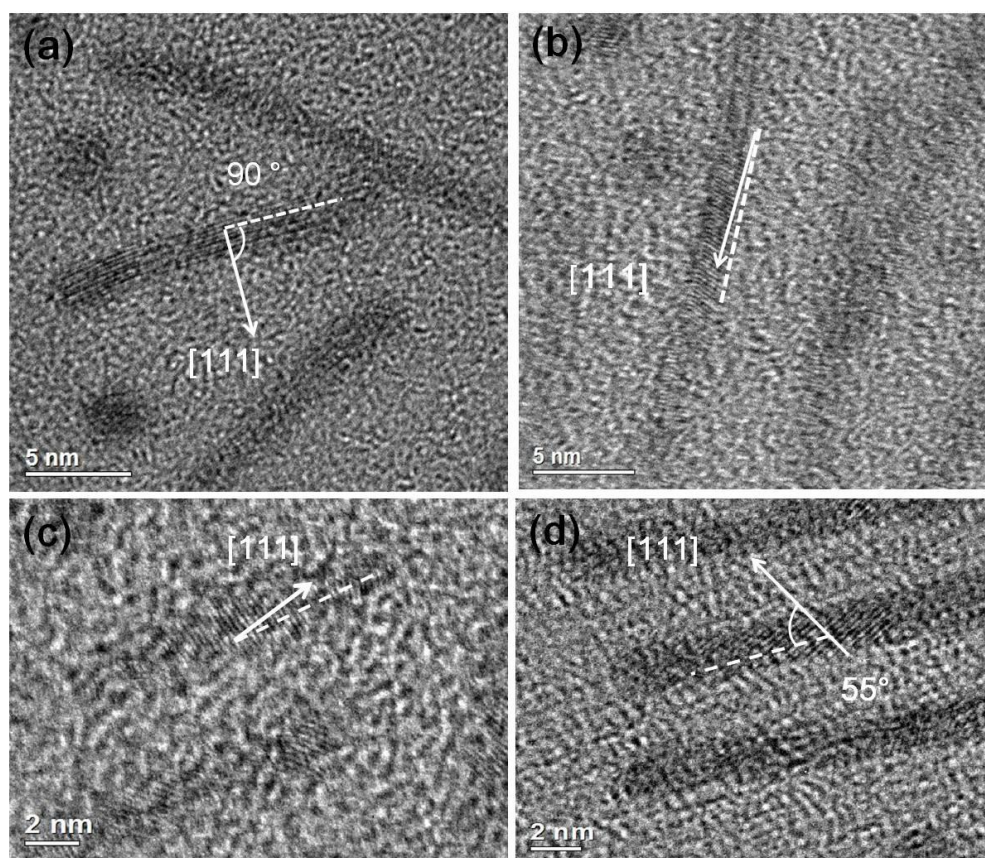


**Figure S1.** (a) HRTEM image of nanospheres from 1 : 1 sample, reaction time is 3 h. (b) TEM image of nanospheres at a low magnification and the self-assembly of nanospheres into one layer (right bottom corner) and two layers.

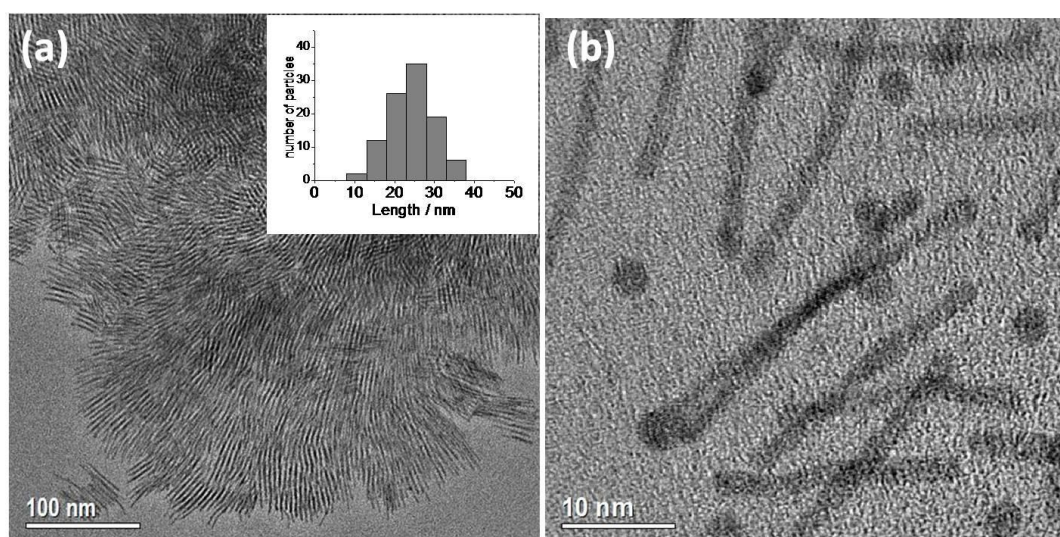


**Figure S2.** Plot of width versus length of the nanorods in the 25 min sample with 1:1 amine and acid.

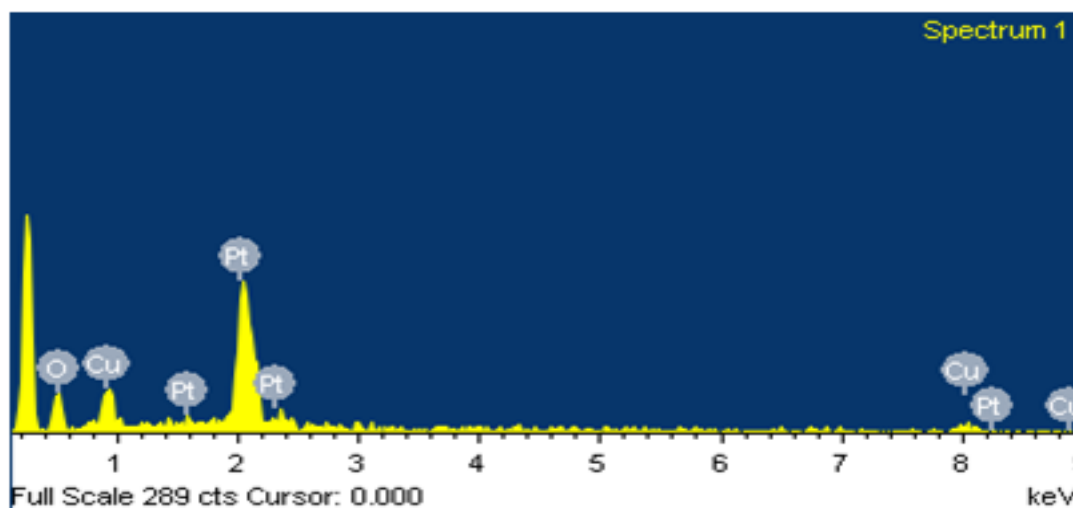




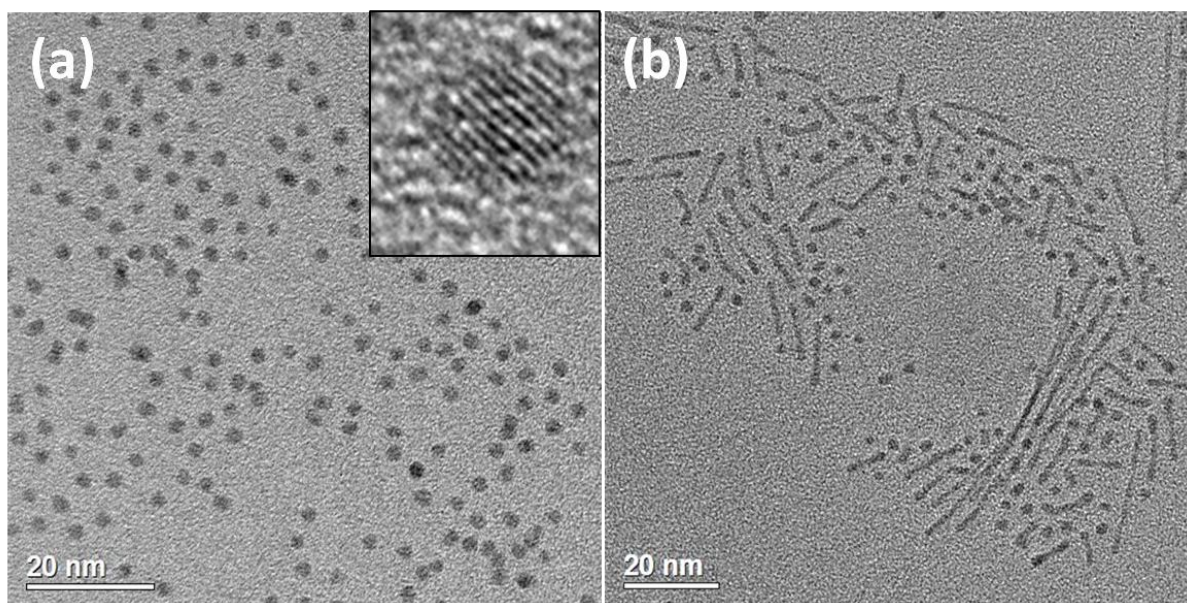
**Figure S3.** HRTEM images of nanorods with various growth directions. Growth directions and [111] directions are marked by dash lines and arrows respectively.



**Figure S4.** TEM images of nanorods synthesized with 1.5 times amount of hexadecylamine (a) large area of nanorod assembly. Inset is the corresponding length histogram. (b) Individual nanorods.

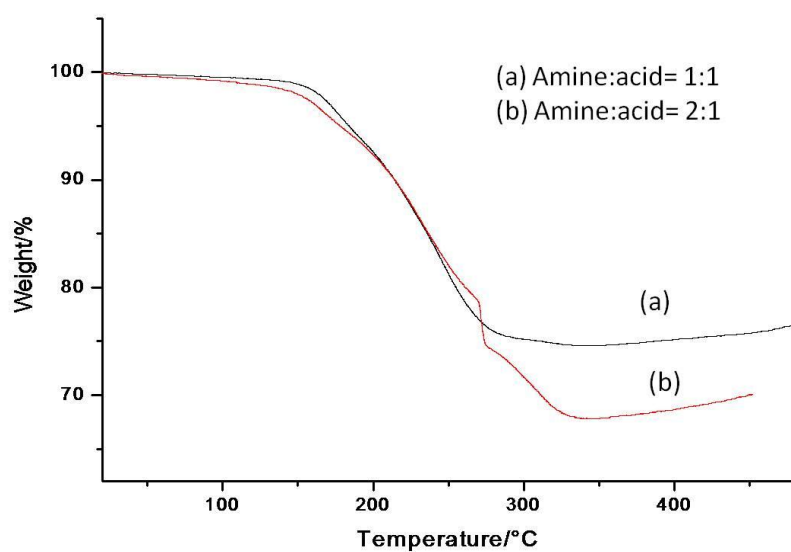


**Figure S5.** EDX result of two-step CuPt nanowires, with a Cu:Pt atomic ratio of 42: 58.

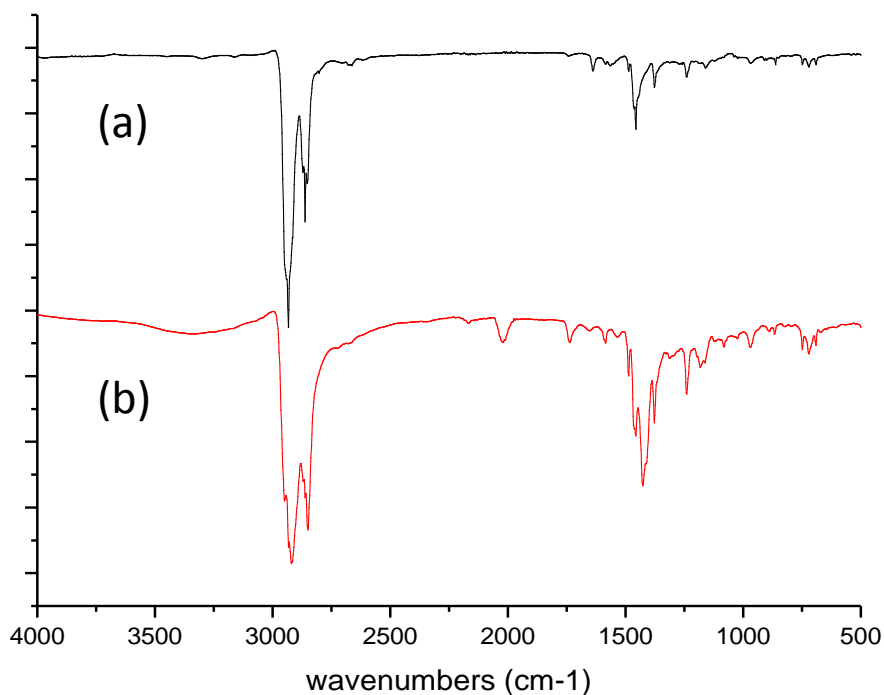


**Figure S6.** TEM images of (a) CuPt nanospheres prepared with amine: acid=0.5: 0.5 in the first step; Inset is HRTEM image of a nanospheres. And (b) adding amine: acid = 1: 1 to the mixture at the second step, elongated nanorods were produced.

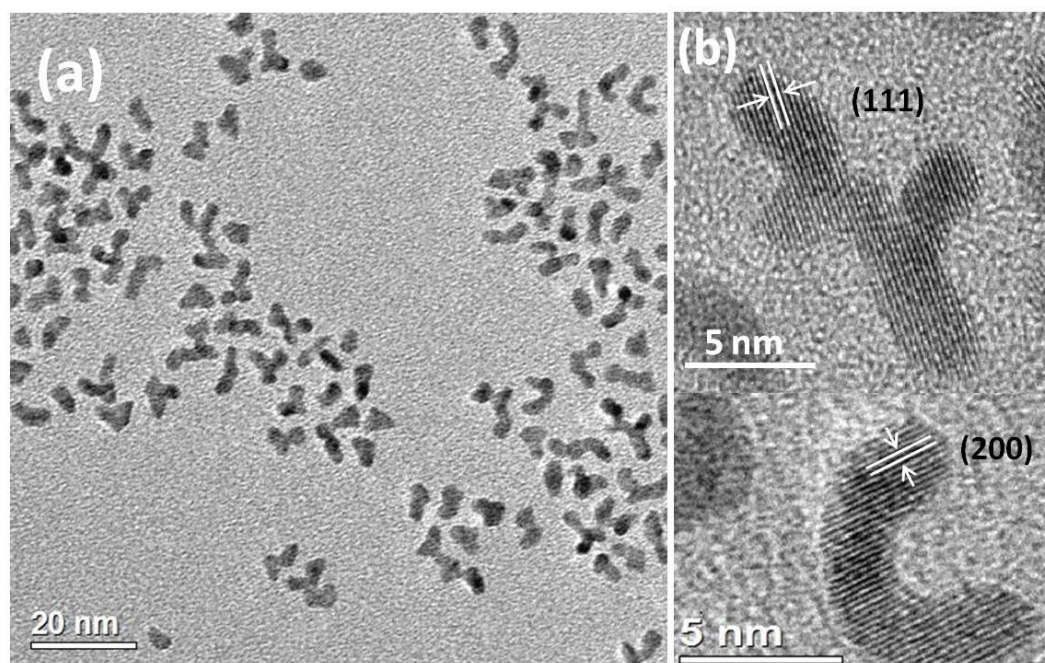




**Figure S7.** TGA result from the (a)1:1 and (b) 2:1 specimen of nanorods.



**Figure S8.** IR spectra of CuPt nanorods synthesized with (a) amine: acid = 2:1, (b) amine: acid = 1.5:1. The  $\nu_{\text{sym}}(\text{OCO})$  band at  $\sim 1420\text{ cm}^{-1}$  is observed in spectrum (b), but not in spectrum (a). Instead, the bands observed in spectrum (a) indicate that amine adsorption is dominant under these preparation conditions.



**Figure S9.** (a) TEM and (b) HRTEM images of Pt nanorods prepared under the same condition for photocatalytic test.