

# Pt-CuS heterodimers by sulfidation of CuPt alloy nanoparticles and their selective catalytic activity toward methanol oxidation

*Xianguang Ding,<sup>abc</sup> Yu Zou,<sup>a</sup> Feng Ye,<sup>d</sup> Jun Yang<sup>\*d</sup> and Jiang Jiang<sup>\*a</sup>*

<sup>a</sup> i-Lab and Division of Nanobiomedicine, Suzhou Institute of Nano-tech and Nano-Bionics, Chinese Academy of Sciences, Suzhou, China 215123. Fax: +86-512- 6260 3079; Tel: +86-512- 6287 2662; E-mail: jjiang2010@sinano.ac.cn

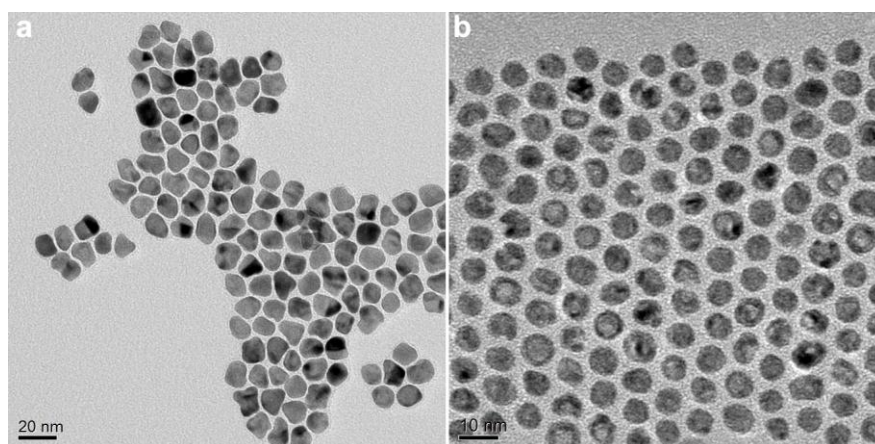
<sup>b</sup> Institute of Biophysics, Chinese Academy of Sciences, Beijing, China 100101

<sup>c</sup> Graduate University of Chinese Academy of Sciences

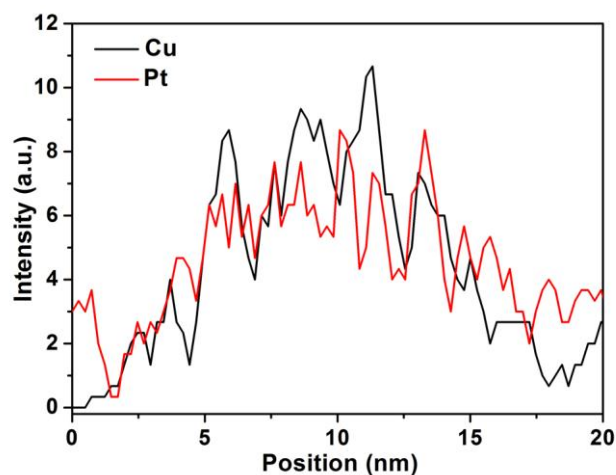
<sup>d</sup> State Key Laboratory of Multiphase Complex Systems, Institute of Process Engineering, Chinese Academy of Sciences, Beijing, China 100190. Fax: +86-10-8254 4814; Tel: +86-10-8254 4915; E-mail: jyang@mail.ipe.ac.cn

## Electronic Supplementary Information

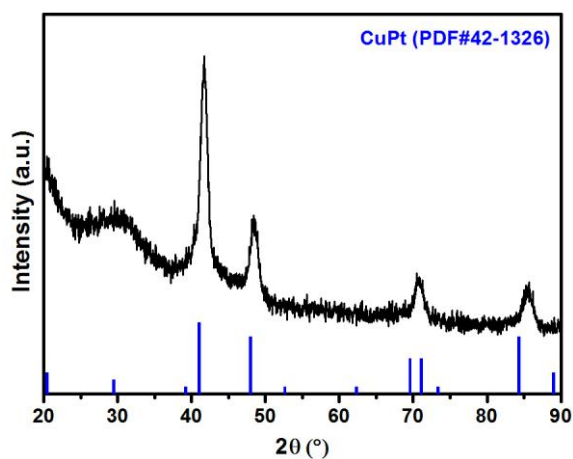
**Fig. S1** TEM images of CuPt alloy nanoparticles synthesized by (a) Cu-seeded growth and (b) Pt-seeded growth method.



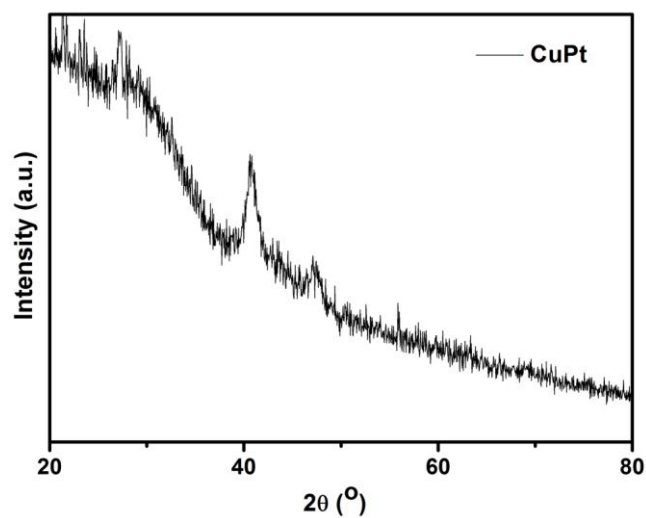
**Fig. S2** Elemental line scan profile corresponding to CuPt alloy nanoparticles shown in Fig. S1b. A rather homogeneous distribution of Cu and Pt was observed, indicating successful synthesis of CuPt alloys.



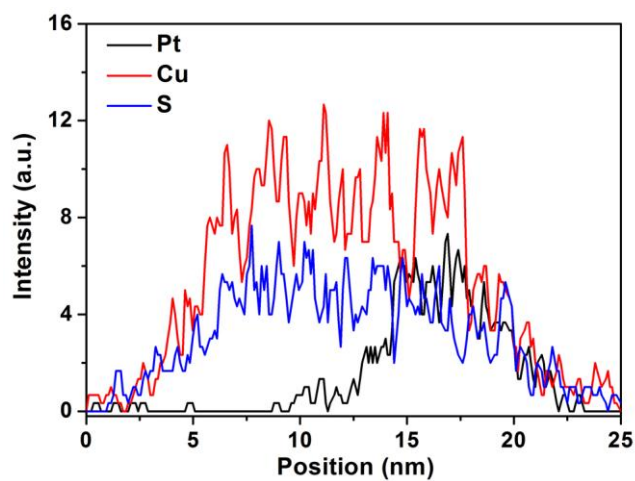
**Fig. S3** X-ray diffraction pattern of CuPt alloy nanoparticles grown from Cu seeds.



**Fig. S4** X-ray diffraction pattern of CuPt alloy nanoparticles grown from Pt seeds.



**Fig. S5** Elemental line scan profile corresponding to Pt-CuS heterodimer nanoparticles shown in Fig. 2a.



**Fig. S6** Room-temperature CO stripping from the CuS-Pt heterodimers and commercial Pt/C catalysts in HClO<sub>4</sub> (0.1 M).

