Supplementary Material

**Facile synthesis of Pt-Ag octahedral and tetrahedral nanocrystals with enhanced activity and durability toward methanol oxidation**

Ming Zhao

*School of Chemistry and Biochemistry, Georgia Institute of Technology, Atlanta, Georgia 30332, USA*

Xuan Yang

*The Wallace H. Coulter Department of Biomedical Engineering, Georgia Institute of Technology and Emory University, Atlanta, Georgia 30332, USA*

Zachary D. Hood

*School of Chemistry and Biochemistry, Georgia Institute of Technology, Atlanta, Georgia 30332, USA; and Center for Nanophase Materials Sciences, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831, USA*

Miaofang Chi

*Center for Nanophase Materials Sciences, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831, USA*

Younan Xiaa)

*The Wallace H. Coulter Department of Biomedical Engineering, Georgia Institute of Technology and Emory University, Atlanta, Georgia 30332, USA; and School of Chemistry and Biochemistry, Georgia Institute of Technology, Atlanta, Georgia 30332, USA*

a)Address all correspondence to this author: younan.xia@bme.gatech.edu



**FIG. S1.** TEM image of the Ag nanocrystals prepared using the standard protocol except for the absence of the Pt(IV) precursor.



**FIG. S2.** TEM images of the Pt-Ag nanocrystals prepared using the standard protocol except for the use of different reaction temperatures: (a) 150 °C and (b) 170 °C, respectively.



**FIG. S3.** (a) TEM image of the nanoparticles obtained using the standard protocol except for the absence of PVP. (b) TEM image at a high magnification taken from the region marked by a box in panel a.



**FIG. S4.** TEM images of carbon-supported catalysts: (a) the commercial Pt/C and (b) the Pt-Ag alloy nanocrystals.

**Table SI.** The elemental composition of Pt-Ag alloy nanocrystals prepared using the standard protocol.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Percentage of Pt (wt.%) | Percentage of Ag (wt.%) | Pt : Ag (mol/mol) |
| Pt-Ag nanocrystals | 72.2 | 27.8 | 3:2 |