

Aqueous-phase aerobic oxidation of alcohols by soluble Pt nanoclusters in the absence of bases

Tao Wang^{a,b}, Chao-Xian Xiao^a, Liang Yan^a, Lin Xu^a, Jie Luo^a, Heng Shou^a, Yuan Kou^{*a},
Haichao Liu^{*a}

^aPKU Green Chemistry Centre, Beijing National Laboratory for Molecular Sciences, College of Chemistry and Molecular Engineering, Peking University, Beijing 100871, China. Fax: 86-10-62751708; Tel: 86-10-62757792; E-mail: yuankou@pku.edu.cn; ^bCenter for Computational Science & Engineering, Peking University, Beijing 100871, China.

Electronic Supplementary Information

The procedure of preparing Pt nanoclusters

1. Preparation of Pt-H₂

H₂PtCl₆·6H₂O (49.9 mg, 0.0963 mmol), PVP (0.427 g, 3.85 mmol) and 15 ml deionized water were added into a 60 ml steel autoclave reactor. After closing the reactor, it was flushed with 10 bar hydrogen three times, then it was pressurized to 30 bar with hydrogen and heated to 80 °C within 0.5 h. After 3 hours at 80 °C, the autoclave cooled down, and a transparent black solution was obtained. Afterwards, the black solution was diluted to 50 ml with deionized water to form Pt-H₂ (1.93×10⁻³ mol/L).

2. Preparation of Pt-NaBH₄

H₂PtCl₆·6H₂O (49.9 mg, 0.0963 mmol) and PVP (0.427 g, 3.85 mmol) was added to 5 ml deionized water and stirred for 30 minutes in ice-water bath, to which then an aqueous solution of NaBH₄ (0.0193 M, 5 ml) was rapidly added under vigorous stirring. Immediately, the color of the solution turns to black. The resulting solution was dialyzed overnight in deionized water. Afterwards, the black solution was diluted to 50 ml with deionized water to form Pt-NaBH₄ (1.93×10⁻³ mol/L).

3. Preparation of Pt-EW

H₂PtCl₆·6H₂O (49.9 mg, 0.0963 mmol) and PVP (0.427 g, 3.85 mmol) was added to a mixture of deionized water (15ml) and ethanol (15ml). The solution was refluxed and stirred for 3h. After reaction, the color of the solution was black. Then the solvent was removed by rotary evaporation. Afterwards, the residue was dissolved in 50 ml deionized water to form Pt-EW (1.93×10⁻³ mol/L).