Electronic supplementary information

Enhanced electrocatalytic ethanol oxidation reaction in alkaline media over Pt on 2D $BiVO_4$ modified electrode under visible light irradiation

Jiayue Hu [a], Chunyang Zhai [a,*], Lixi Zeng [b], Yukou Du,[c] and Mingshan Zhu [a,b,*]

[a] School of Materials Science and Chemical Engineering, Ningbo University, Ningbo 315211, P.R. China

[b] Guangdong Key Laboratory of Environmental Pollution and Health, School of Environment, Jinan University, Guangzhou 510632, P.R. China

[c] College of Chemistry, Chemical Engineering and Materials Science, Soochow University, Suzhou 215123, P. R. China

Email: mingshanzhu@yahoo.com (M.Z); zhaichunyang@nbu.edu.cn (C.Z)

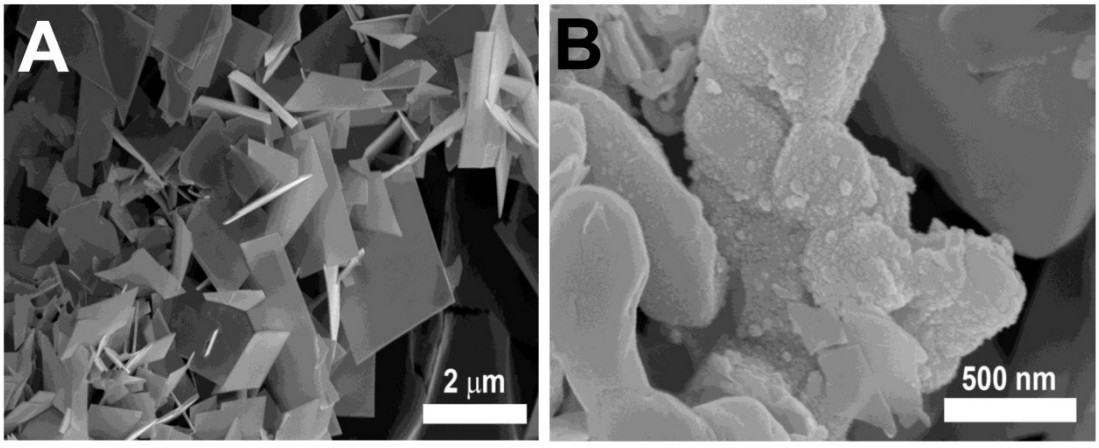

Fig. S1. SEM images of $BiVO_4$ (A) and Pt-$BiVO_4$ (B).

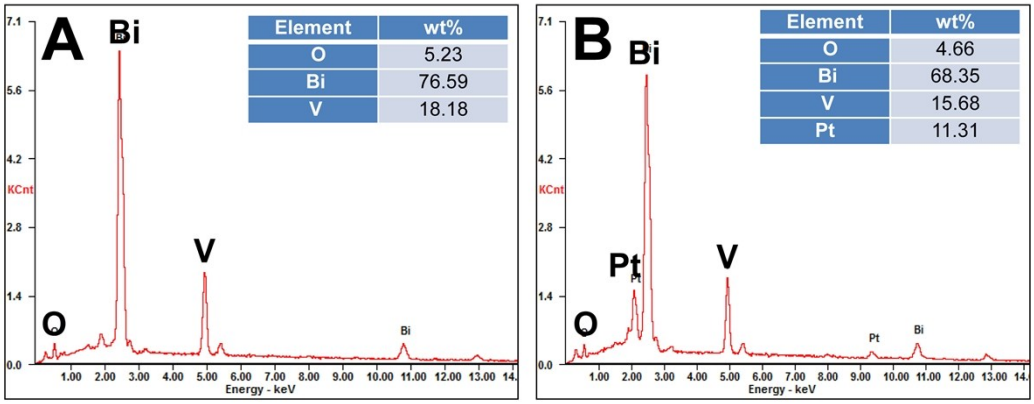

Fig. S2. EDX spectra of $BiVO_4$ (A) and Pt-$BiVO_4$ (B).

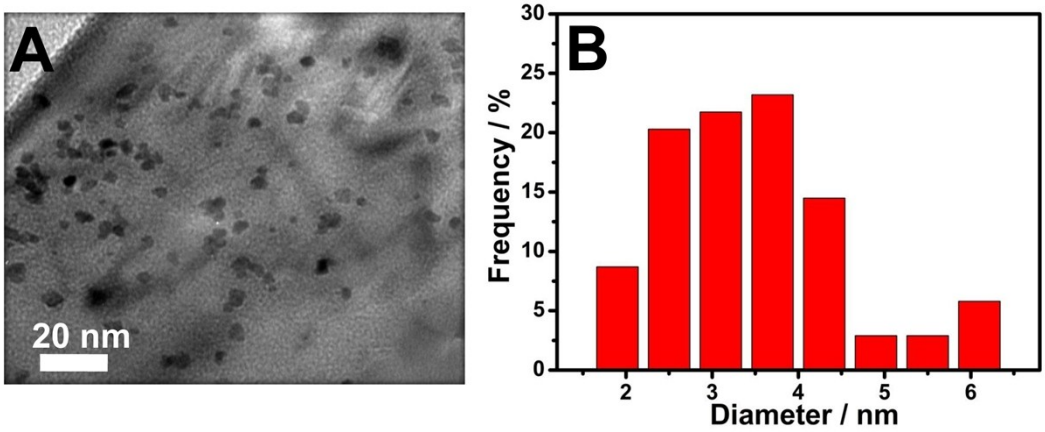

Fig. S3. TEM image (A) and the size distribution of Pt NPs in Pt-$BiVO_4$ nanocomposites (B).

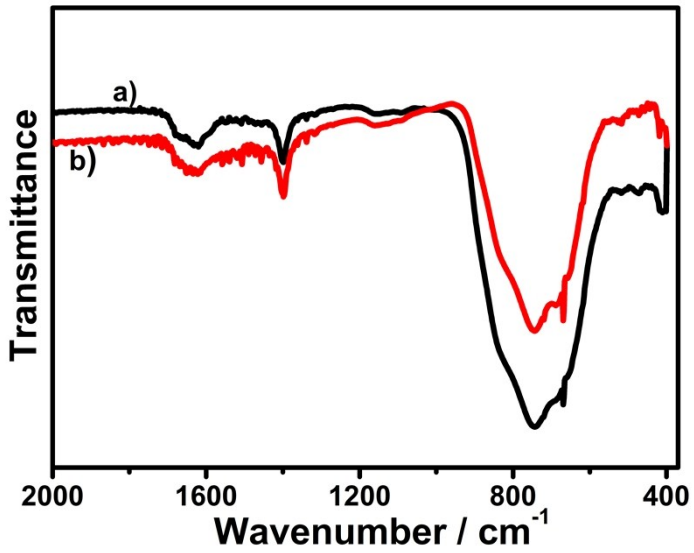

Fig. S4. FT-IR spectra of $BiVO_4$ (a) and Pt-$BiVO_4$ (b).

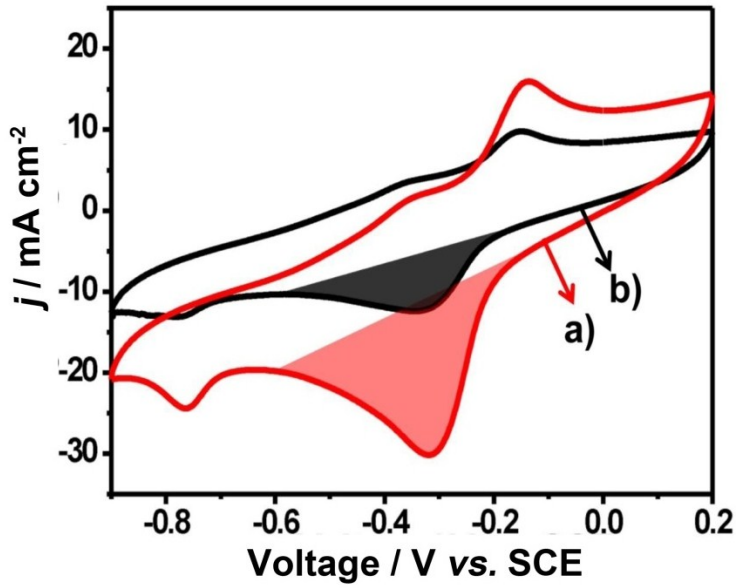

Fig. S5. CVs of Pt-$BiVO_4$ in 1.0 M KOH solution under visible light irradiation (a) and dark condition (b) at a scan rate of 50 mV s^{-1}.

Table S1. EDX analysis of elementals content of $BiVO_4$ and Pt-$BiVO_4$.

	EDX (wt%)	
Element	$BiVO_4$	Pt-$BiVO_4$
Bi	76.59 %	68.35 %
O	5.23 %	4.66%
V	18.18 %	15.68 %
Pt		11.31 %

Table S2. Recent reports on electrocatalytic activity of ethanol oxidation with different catalysts.

Catalyst	Ethanol oxidation activity		Reference
Pt-tantalum carbide	1.2 mA cm^{-2}		Appl Catal B: Environ 2018; 234:329-336
PtCoFe	4.75 mA cm^{-2}		Small 2017; 3:1700250
Pt_1Mo_1/C	1000 mA mg^{-1}_{Pt}		Appl Catal B: Environ 2017; 203:654-662
Ni@Pt/C	14.30 mA cm^{-2}		Electrochim Acta 2017; 242:187-201
PtCu	19.3 mA cm^{-2}		Nanoscale 2017; 9: 2963–2968
Pt–NiO_x	1.68 mA cm^{-2}		RSC Adv 2018; 8: 698–705
$Pt_1Ru_{0.5}Sn_{0.5}$-RGO	1517 mA mg^{-1}_{Pt}		J Colloid Interface Sci 2017; 506: 135-143
$Pt_x/Ni@C_{N\text{-}doped}$	273 mA mg^{-1}_{Pt}		J Colloid Interface Sci 2018; 524:360-367
PtPd NPs	471.3 mA mg^{-1}_{Pt}		Nano Res 2017; 10: 1064-1077
Pt-$BiVO_4$	dark	visible light	This work
	591.3 mA mg^{-1}_{Pt}; 8.45 mA cm^{-2}	1555 mA mg^{-1}_{Pt}; 22.2 mA cm^{-2}	