Electronic supplementary information

Enhanced electrocatalytic ethanol oxidation reaction in alkaline media over Pt on 2D BiVO₄ modified electrode under visible light irradiation

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Fig. S1. SEM images of BiVO₄ (A) and Pt-BiVO₄ (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$_4$.

<table>
<thead>
<tr>
<th>Element</th>
<th>BiVO$_4$</th>
<th>Pt-BiVO$_4$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bi</td>
<td>76.59 %</td>
<td>68.35 %</td>
</tr>
<tr>
<td>O</td>
<td>5.23 %</td>
<td>4.66 %</td>
</tr>
<tr>
<td>V</td>
<td>18.18 %</td>
<td>15.68 %</td>
</tr>
<tr>
<td>Pt</td>
<td></td>
<td>11.31 %</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Catalyst</th>
<th>Ethanol oxidation activity</th>
<th>Reference</th>
</tr>
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<tbody>
<tr>
<td>Pt-tantalum carbide</td>
<td>1.2 mA cm$^{-2}$</td>
<td>Appl Catal B: Environ 2018; 234:329-336</td>
</tr>
<tr>
<td>PtCoFe</td>
<td>4.75 mA cm$^{-2}$</td>
<td>Small 2017; 3:1700250</td>
</tr>
<tr>
<td>Pt$<em>{1}$Mo$</em>{0.1}$/C</td>
<td>1000 mA mg$^{-1}$Pt</td>
<td>Appl Catal B: Environ 2017; 203:654-662</td>
</tr>
<tr>
<td>Ni@Pt/C</td>
<td>14.30 mA cm$^{-2}$</td>
<td>Electrochim Acta 2017; 242:187-201</td>
</tr>
<tr>
<td>PtCu</td>
<td>19.3 mA cm$^{-2}$</td>
<td>Nanoscale 2017; 9: 2963–2968</td>
</tr>
<tr>
<td>Pt–NiO$_x$</td>
<td>1.68 mA cm$^{-2}$</td>
<td>RSC Adv 2018; 8: 698–705</td>
</tr>
<tr>
<td>Pt$<em>1$Ru$</em>{0.5}$Sn$_{0.5}$-RGO</td>
<td>1517 mA mg$^{-1}$Pt</td>
<td>J Colloid Interface Sci 2017; 506: 135-143</td>
</tr>
<tr>
<td>Pt$<em>{x}$/Ni@C$</em>{N}$-doped</td>
<td>273 mA mg$^{-1}$Pt</td>
<td>J Colloid Interface Sci 2018; 524:360-367</td>
</tr>
<tr>
<td>PtPd NPs</td>
<td>471.3 mA mg$^{-1}$Pt</td>
<td>Nano Res 2017; 10: 1064-1077</td>
</tr>
<tr>
<td>Pt-BiVO$_4$</td>
<td>591.3 mA mg$^{-1}$Pt; 8.45 mA cm$^{-2}$</td>
<td>This work</td>
</tr>
<tr>
<td></td>
<td>visible light</td>
<td>1555 mA mg$^{-1}$Pt; 22.2 mA cm$^{-2}$</td>
</tr>
</tbody>
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