Supporting Information

Growth of Small Au Nanoparticles on ZnO Nanorods in situ via Ultrasonic Irradiation toward Supper-Enhanced Catalysis Activity

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Fig. S1 XRD pattern (a), SEM image (b) and TEM image (c) of pure ZnO NRs. (d) A selected area electron diffraction pattern of an arbitrarily selected single ZnO nanorod.
Fig. S2 TEM and HRTEM images of Pt/ZnO-1 (a-b) and Pt/ZnO-2 (c-d).

Fig. S3 High-resolution XPS spectra of Zn2p and O1s in Au/ZnO-1 (a-b) and Au/ZnO-2 (c-d).
Fig. S4 EDX analysis of samples Au/ZnO-1 (a), Au/ZnO-2 (b), Pt/ZnO-1 (c) and Pt/ZnO-2 (d).
The EDX analysis of Au/ZnO and Pt/ZnO samples further clearly revealed the existence of Au
and Pt elements, whereas the signals for O and Zn are from the ZnO support. The EDX spectra
indicate that the Au loadings are 1.34 % and 2.80 % for Au/ZnO-1 and Au/ZnO-2 catalysts,
respectively. Similarly, the actual Pt loadings of Pt/ZnO-1 and Pt/ZnO-2 nanostructures are 1.34 %
and 3.20 %, respectively.

The deposition amount of the noble metals (Au and Pt) was raised with increasing the amount
of precursors (HAuCl₄ and H₂PtCl₆). Compared with the nominal molar ratio of Au/ZnO, we
found that the measured ratio of Au/ZnO from EDX analysis is relatively low, which was
indicated that the part of Au³⁺ ions in the solution was reduced under the ultrasonic-wave
irradiation and deposited on the surface of the ZnO NRs. Similar conclusion was obtained for
Pt/ZnO catalysts.

Fig. S5 Temporal evolution of absorption spectra of the RhB solution as a function of irradiation
time in the presence of Au/ZnO-2 under UV irradiation.

Fig. S6 CO conversion as a function of reaction temperature for CO oxidation on Au/ZnO-3, and
Pt/ZnO-3 catalysts.
**Table S1** Conversion temperature of CO using Au/ZnO-3 and Pt/ZnO-3 NRs catalysts

<table>
<thead>
<tr>
<th>Sample</th>
<th>Au/ZnO-3</th>
<th>Pt/ZnO-3</th>
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<tbody>
<tr>
<td>T_{50}[°C]</td>
<td>196</td>
<td>176</td>
</tr>
<tr>
<td>T_{100}[°C]</td>
<td>211</td>
<td>179</td>
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