In-situ growth of metal nanoparticles on boron nitride nanosheets as highly efficient catalysts

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\begin{center}
\includegraphics[width=0.5\textwidth]{fig_s1.png}
\end{center}

\textbf{Fig. S1} FTIR spectra of pristine h-BN powder and BNNS collected after 1 h, 3h, 5h and 10h tip-sonication.
**Fig. S2** N 1s narrow XPS scans of BNNS exfoliated in NaOH-water system for 1 h, 3 h and 5 h.

**Fig. S3** SEM images of (A) pristine h-BN and (B) h-BN residue after exfoliation. (C) TEM image of pristine h-BN.
Fig. S4 (A) Lateral size distribution and (B) thickness distribution of BNNS.

Fig. S5 (A) UV-vis spectra of BNNS, BNNS-5h-Au and BNNS-10h-Au nanocomposites. (B) Digital photos of BNNS-1h-Au, BNNS-5h-Au and BNNS-10h-Au.
Fig. S6 XRD patterns of BNNS and BNNS-Au nanocomposite.
**Fig. S7** SEM images of (A) BNNS-Ag, (B) BNNS-Pd and (C) BNNS-Pt nanocomposites. (D) Ag 3d narrow XPS scan of BNNS-Ag nanocomposite. (E) Pd 3d narrow XPS scan of BNNS-Pd nanocomposite. (F) Pt 4f narrow XPS scan of BNNS-Pt nanocomposite.

**Fig. S8** UV–visible spectra of Rh B during the reduction process in the presence of (A) NaBH$_4$ and (B) BNNS+NaBH$_4$.

**Fig. S9** (A) The catalytic performance of BNNS-Au NP composite for 3 cycles Rh B degradation. (B) SEM image of BNNS-Au NP composite after 3 cycles Rh B degradation.

**Table S1** Performance comparison of the proposed BNNS-Au nanocomposite and other reported catalysts towards the reduction of RhB.
Table S2 Performance comparison of the proposed BNNS/Au/GCE and other electrodes towards the electrochemical detection of hydrazine.

<table>
<thead>
<tr>
<th>Electrode</th>
<th>Method</th>
<th>LOD (μM)</th>
<th>Linear range (μM)</th>
<th>Reference</th>
</tr>
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<tbody>
<tr>
<td>CeO$_2$–OMC* /GCE</td>
<td>I-T</td>
<td>0.012</td>
<td>0.04-192</td>
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<tr>
<td>Au@Pd-TiO$_2$NTs* /GCE</td>
<td>I-T</td>
<td>0.012</td>
<td>0.06-700</td>
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<tr>
<td>Au@Pd-rGO* /GCE</td>
<td>I-T</td>
<td>0.08</td>
<td>2-40</td>
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<tr>
<td>rGO-ZnO/GCE</td>
<td>I-T</td>
<td>0.8</td>
<td>1-33500</td>
<td>8</td>
</tr>
<tr>
<td>DHsalophen isomers/GCE</td>
<td>CV</td>
<td>1.6</td>
<td>10-400; 400-4000</td>
<td>9</td>
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<tr>
<td>Polypyrrole NWs* - AuNPs/GCE</td>
<td>DPV</td>
<td>0.2</td>
<td>1-500; 500-7500</td>
<td>10</td>
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<tr>
<td>BNNS-Au/GCE</td>
<td>DPV</td>
<td>0.0014</td>
<td>0.0005-0.5; 0.5-20; 20-2500</td>
<td>This work</td>
</tr>
</tbody>
</table>

*OMC = ordered mesoporous carbon  *NTs = nanotubes  *rGO = reduced graphene oxide  *NWs = nanowires

References


