Nitrogen-doped magnetic carbon nanoparticles as catalyst supports for efficient recovery and recycling

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1. Electron diffraction pattern of Pd/N-MCNPs

Fig. S1 Electron diffraction pattern of Pd/N-MCNPs (P: palladium; M: γ-Fe₂O₃).
2. Control experiments

2.1. Vulcan XC72R

Fig. S2 a) TEM image and b) XRD pattern of Pd-deposited Vulcan XC72R. The diameter of palladium nanoparticles estimated from the TEM observation ranged from 2 to 28 nm (see Fig. S1a inset), and the average size of palladium crystallites calculated using Scherrer formula with Pd(111) was 22.0 nm.

2.2. Carbon black prepared by thermal plasma processing (CB-TPP)

Fig. S3 a) TEM image and b) XRD pattern of Pd-deposited CB-TPP. The diameter of palladium nanoparticles estimated from the TEM observation ranged from 2 to 20 nm (see Fig. S2a inset), and the average size of palladium crystallites calculated using Scherrer formula with Pd(111) was 13.0 nm.
2.3. Major textural parameters of three different catalyst supports

<table>
<thead>
<tr>
<th>Sample</th>
<th>$S_{\text{BET}}$ (m² g⁻¹)</th>
<th>$V_{\text{micro}}$ (cm³ g⁻¹)</th>
<th>$V_{\text{total}}$ (cm³ g⁻¹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-MCNPs</td>
<td>360</td>
<td>0.15</td>
<td>0.44</td>
</tr>
<tr>
<td>Vulcan XC72R</td>
<td>232</td>
<td>0.04</td>
<td>0.32</td>
</tr>
<tr>
<td>CB-TPP</td>
<td>313</td>
<td>-</td>
<td>0.73</td>
</tr>
</tbody>
</table>

*These data were taken from the reference (Chai et al., *J. Phys. Chem. B*, 2004, **108**, 7074). $S_{\text{BET}}$: BET surface area; $V_{\text{micro}}$: micropore volume obtained using Horvath-Kawazoe method; $V_{\text{total}}$: total pore volume.