Supplementary Information

Yolk-shell nanospheres with soluble amino-polystyrene as reservoir for Pd NPs

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Figure S1. TEM image of PS@mesoSiO$_2$ YSNs

Figure S2. IR spectra for PS@mesoSiO$_2$-S YSNs (a) before nitration, (b) after nitration with 0.5mL HNO$_3$. 
Figure S3. TEM images of PS-NH$_2$@mesoSiO$_2$-L after treatment in (a) ethyl acetate, (b) dioxane, (c) acetonitrile, (d) N, N dimethyl amide, (e) thionyl chloride and (f) dichloromethane for 19 h.

Figure S4. TG curves of (a) PS-NH$_2$@mesoSiO$_2$-S, (b) PS-NH$_2$@mesoSiO$_2$-S after treatment with TEA/toluene=1 under the air.
Figure S5. TEM image of 2wt%Pd/PS-NH$_2$@mesoSiO$_2$-L after 1 cycle.

Table S1. Textural properties of Pd/PS-NH$_2$@mesoSiO$_2$ catalysts.

<table>
<thead>
<tr>
<th>samples</th>
<th>$S_{\text{BET}}$ (m$^2$.g$^{-1}$)</th>
<th>Pore volume (cm$^3$.g$^{-1}$)</th>
<th>Pore diameter (nm)</th>
<th>N content (wt%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2wt%Pd/PS-NH$_2$@mesoSiO$_2$-S YSNs</td>
<td>540</td>
<td>0.45</td>
<td>1.3/2.4</td>
<td>1.17</td>
</tr>
<tr>
<td>2wt%Pd/PS-NH$_2$@mesoSiO$_2$-L YSNs</td>
<td>507</td>
<td>0.41</td>
<td>1.3/2.4</td>
<td>3.38</td>
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<tr>
<td>1wt%Pd/PS-NH$_2$@mesoSiO$_2$-L YSNs</td>
<td>521</td>
<td>0.42</td>
<td>1.3/2.4</td>
<td>3.44</td>
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</table>