Supporting Information (SI)

Synthesis of Uniform Microporous Polymer Nanoparticles and Their Applications for Hydrogen Storage

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**Fig. S1** TEM image for precursor emulsion with 45 nm was taken on a Tecnai G20 microscope (FEI Corp. USA) instrument operated at an accelerating voltage of 200 kV.
**Fig. S2** TEM image for MPNs with 45 nm was taken on a Tecnai G20 microscope (FEI Corp. USA) instrument operated at an accelerating voltage of 200 kV.
**Fig. S3** Samples were analyzed with Bruker VERTEX 70 FT-IR Spectroscopy and ATR Accessory under ambient conditions in the wave number range of 4000-400 cm\(^{-1}\).
**Fig. S4** Volumetric H$_2$ adsorption isotherms and desorption isotherms for “Davankov Resins” and MPNs with 60 nm and their mixture (volume ratio, 1:1) up to 1.13 bar at 77.3 K.
Fig. S5 Nitrogen adsorption isotherm and desorption isotherm for “Davankov Resins” and MPNs with 60 nm and their mixture (volume ratio, 1:1) at 77.3 K.
**Fig. S6** Pore size distributions for “Davankov Resins” and MPNs with 60 nm and their mixture (volume ratio, 1:1) using DFT methods (slit pore models, Differential Pore Volume vs. Pore Width).
Table S1 Packing density, surface area, pore structure and H$_2$ uptakes for “Davankov Resins” and MPNs with 60 nm and their mixture (volume ratio, 1:1).

<table>
<thead>
<tr>
<th>No.</th>
<th>Particle size (nm)$^i$</th>
<th>Packing density (g/cm$^3$)</th>
<th>$S_{\text{meq}}$$^b$ (m$^2$/g)</th>
<th>$S_L$$^c$ (m$^2$/g)</th>
<th>$V_m$$^d$ (cm$^3$/g)</th>
<th>$V_L$$^e$ (cm$^3$/g)</th>
<th>$V_t$$^f$ (cm$^3$/g)</th>
<th>$V_m$$^g$ (cm$^3$/g)</th>
<th>$V_L$$^h$ (cm$^3$/g)</th>
<th>H$_2$ uptake (g/L)$^i$</th>
<th>H$_2$ uptake (wt%)$^j$</th>
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<tbody>
<tr>
<td>1</td>
<td>100μm$^i$</td>
<td>0.344</td>
<td>1460</td>
<td>1965</td>
<td>0.48</td>
<td>0.97</td>
<td>0.41</td>
<td>0.83</td>
<td>1460</td>
<td>4.54</td>
<td>1.32</td>
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<td>4</td>
<td>60</td>
<td>0.257</td>
<td>1463</td>
<td>1975</td>
<td>0.54</td>
<td>2.13</td>
<td>0.45</td>
<td>1.35</td>
<td>1463</td>
<td>3.93</td>
<td>1.53</td>
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<tr>
<td>7$^i$</td>
<td>N.D.$^i$</td>
<td>0.384</td>
<td>1492</td>
<td>2024</td>
<td>0.53</td>
<td>1.40</td>
<td>0.41</td>
<td>0.85</td>
<td>2024</td>
<td>5.45</td>
<td>1.42</td>
</tr>
</tbody>
</table>

Note.
[a] DLS (Dynamic Light Scattering) results;  
[b] Brunauer-Emett-Teller surface area;  
[c] Langmuir surface area;  
[d] Micropore volume determined from the N$_2$ isotherm at P/P$_0$ = 0.050;  
[e] Total pore volume determined from the N$_2$ isotherm at P/P$_0$ = 0.995;  
[f] Slit pore model used in DFT calculations;  
[g] Determined volumetrically using a Micromeritics ASAP 2020 M analyzer at 77.3 K and 1.13 bar;  
[h] The particle size was estimated according to the FE-SEM image;  
[i] Sample 7 is mixture of “Davankov Resins” and MPNs with 60 nm in volume ratio of 1:1;  
[j] N.D. means the sample was not determined in this parameter.