Supporting Information

**Small-sized Mg-Al LDH nanosheets supported on silica aerogel with large pore channels: Textural properties and basic catalytic performance after activation**

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**Figures and Tables**
Figure S1 TEM images of SA/LDH-Mg$_2$Al-80 (a), SA/LDH-Mg$_5$Al$_2$-80 (b), SA/LDH-Mg$_3$Al-80 (c), SA/LDH-Mg$_2$Al-105 (d) and SA/LDH-Mg$_2$Al-150 (e) with a large length-to-height ratio of 1.5; the insets are the radial diameter distributions of the supported LDH nanosheets acquired from >150 nanoparticles in the corresponding images.
Figure S2 Thickness distributions of the supported LDH nanosheets: SA/LDH-Mg₂Al-80 (a), SA/LDH-Mg₅Al₂-80 (b), SA/LDH-Mg₃Al-80 (c), SA/LDH-Mg₂Al-105 (d) and SA/LDH-Mg₂Al-150 (e) acquired from >150 nanoparticles in Figure S1.
Figure S3 EDS mappings and corresponding elemental analysis of SA/LDH-Mg$_2$Al-80 (a), SA/LDH-Mg$_2$Al-105 (b), SA/LDH-Mg$_2$Al-150 (c), SA/LDH-Mg$_5$Al$_2$-80 (d) and SA/LDH-Mg$_3$Al-80 (e).
Figure S4 (a) N$_2$ adsorption–desorption isotherms and the corresponding BJH pore size distribution (inset) of SA; (b) BJH pore size distributions of the SA/LDH series and the unsupported LDH (LDH-Mg$_2$Al-80).

Figure S5 TEM image of unsupported LDH nanosheets (LDH-Mg$_2$Al-80) using as a contrast sample. The inset is the corresponding radial diameter distribution.
Figure S6 The used catalyst SA/LDH-Mg$_2$Al-80 collected by centrifugation after the reaction of benzaldehyde with nitromethane in different solvents such as nitromethane, ethanol, dichloromethane, toluene, DMF, Water and THF.
**Figure S7** NH$_3$-TPD profiles of SA/LDH series synthesized at a temperature of 80$^\circ$C.

**Table S1** The semi-quantitative results of NH$_3$-TPD measurements. $^a$

<table>
<thead>
<tr>
<th>Samples</th>
<th>NH$_3$-TPD peak position (°C)</th>
<th>Total peak area (a.u.) $^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td>SA/LDH-Mg$_2$Al-80</td>
<td>168.0</td>
<td>440.0</td>
</tr>
<tr>
<td>SA/LDH-Mg$_3$Al$_2$-80</td>
<td>183.6</td>
<td>431.8</td>
</tr>
<tr>
<td>SA/LDH-Mg$_3$Al-80</td>
<td>161.0</td>
<td>429.1</td>
</tr>
</tbody>
</table>

$^a$ Total peak area is linearly proportional to the amount of NH$_3$ adsorbed.