Supporting Information for

Direct synthesis of high-silica nano ZSM-5 aggregates with controllable mesoporosity and its enhanced catalytic properties

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1. Tables

**Table S1** The SiO$_2$/Al$_2$O$_3$ and solid yields of NA-X, C-ZSM-5 and C$_1$-ZSM-5 samples.

<table>
<thead>
<tr>
<th>Samples</th>
<th>SiO$_2$/Al$_2$O$_3$</th>
<th>Solid yields (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA-1</td>
<td>163</td>
<td>76.78</td>
</tr>
<tr>
<td>NA-2</td>
<td>159</td>
<td>72.59</td>
</tr>
<tr>
<td>NA-3</td>
<td>151</td>
<td>68.17</td>
</tr>
<tr>
<td>NA-4</td>
<td>147</td>
<td>59.37</td>
</tr>
<tr>
<td>C-ZSM-5</td>
<td>134</td>
<td>*</td>
</tr>
<tr>
<td>C$_1$-ZSM-5</td>
<td>172</td>
<td>*</td>
</tr>
</tbody>
</table>

a SiO$_2$/Al$_2$O$_3$ molar ratio of the synthesized NA-X, C-ZSM-5 and C$_1$-ZSM-5 zeolites determined by ICP analysis.

2. Figures

**Fig. S1** SEM images for C-ZSM-5 zeolite (a) low magnification, (b) high magnification.

3. Results

3.1 Inductively-coupled plasma (ICP) analysis of synthesized samples

The total silica and aluminum contents in the synthesized samples (NA-X and C-ZSM-5) and the reference material C$_1$-ZSM-5 were determined by ICP analysis (Table S1, ESI). The SiO$_2$/Al$_2$O$_3$ ratios of NA-X(1-4)) and C-ZSM-5 samples were about 163, 159, 151, 147, 134, 172 when a batch SiO$_2$/Al$_2$O$_3$ ratio of 168 was used, which are slightly lower than the theoretical values in the preparative gels. This may be because of the lower availability of silica than alumina in the alkaline medium during their synthesis. The SiO$_2$/Al$_2$O$_3$ ratio of C$_1$-ZSM-5 (172) was higher than the nominal ratio in the starting material (167), which indicates that the Si atoms in synthetic solutions were easier to incorporate into the framework structures of the C$_1$-ZSM-5 zeolite than Al atoms in its hydrothermal synthesis.

Notes and references