Supporting information

New insights into the mesophase transformation of ethane-bridged PMOs by the influence of different counterions under basic conditions

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Figure S1. PMO synthesized with CTACL (cubic structure, $Pm3n$): HRTEM image acquired along the [001] direction and different diffraction patterns acquired along the indicated zone axes.
Figure S2. PMO synthesized with CTA(SO₄)₉₅, (cubic structure, Pm3n): HRTEM image acquired along the [001] direction and different diffraction patterns acquired along the indicated zone axes.
Figure S3. SEM images of ethane-bridged PMOs synthesized with a surfactant mixture CTABr/CTACl with different molar ratios: (a) CTACl:CTABr=4:6 and (b) CTACl:CTABr=6:4. (The blue circles point out the particles with 2-D hexagonal $p6mm$ mesophase, while the red circle point out the particles with cubic $Pm3n$ mesophase)
Figure S4. SEM images of the ethane-bridged PMOs synthesized with the assistance of different sodium salts in the presence of CTACl or CTABr as surfactant: (a) CTACl + NaNO$_3$, (b) CTABr + NaSCN, (c) CTACl + NaSCN, (d) CTACl + NaCl, and (e) CTABr + NaCl
Figure S5 EDX analysis of the as-synthesized ethane-bridged PMO materials prepared with different surfactant: (a) CTABr, (b) CTACl, and (c) CTA(SO$_4$)$_{1/2}$

Table S1 The content of the counterions in as-synthesized ethane-bridged PMO materials

<table>
<thead>
<tr>
<th>Weight</th>
<th>PMO-CTABr</th>
<th>PMO-CTACl</th>
<th>PMO-CTA(SO$<em>4$)$</em>{1/2}$</th>
</tr>
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<tbody>
<tr>
<td>X (Br/Cl/S)</td>
<td>0.53%</td>
<td>1.10%</td>
<td>1.10%</td>
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