Supporting Information

To measuring the absolute molecular weight, triplicate detection SEC system (light scattering, viscometry, and refractive index detectors) was used. PL10K couldn’t obtain the LS scattering curve because of its small molecular weight. Similarly, the curves of LS detection of PL130K show very weak signals despite comparatively high molecular weight of 130K which was calculated by polystyrene standard. It occurred by relatively large hydrodynamic volume induced to stiff polymer chain. The LS curve of PL570K, branched polymer as shown to 3600K weight average molecular weight was clearly appeared.

The measurement of FTIR of PMSQs was carried to con-

Figure S1. Static light scattering (SLS) diagram of (A) PL130K and (B) PL570K.

Figure S2. FTIR spectrum of PMSQs after dry process. (A) PL10K, (B) PL130K, and (C) PL570K.
(A) PL10K of Ra value by AFM: 0.364 nm

(B) PL130K of Ra value by AFM: 0.550 nm
Table S1. Atomic Compositions of PMSQs Calculated by $^{29}$Si NMR Spectrum

<table>
<thead>
<tr>
<th>Sample</th>
<th>H (atomic %)</th>
<th>C (atomic %)</th>
<th>O (atomic %)</th>
<th>Si (atomic %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL10K</td>
<td>48.1</td>
<td>14.8</td>
<td>22.2</td>
<td>14.8</td>
</tr>
<tr>
<td>PL130K</td>
<td>47.2</td>
<td>15.1</td>
<td>22.6</td>
<td>15.0</td>
</tr>
<tr>
<td>PL570K</td>
<td>47.0</td>
<td>15.1</td>
<td>22.7</td>
<td>15.1</td>
</tr>
</tbody>
</table>

Figure S3. Measurements of surface flatness (Ra) by AFM images. (A) PL10K for 0.364 nm, (B) PL130K for 0.550 nm, and PL570K for 0.502 nm.

Figure S4. Nanoindentation of (A) PL10K, (B) PL130K, and (C) PL570K.

firm the molecular stability. There are no changes after drying process at 60 °C for 1 h. Thin films of PMSQs were prepared in same condition.

The surface flatness of thin films of synthesized PMSQs was measured by AFM. The same films after measuring X-ray reflectivity were used. They showed good film properties as indicated below 0.6 nm of Ra values.

The measurement of modulus was carried by Nanoindentation. The values were averaged by twelve indentation results. Films coated over 500 nm were prepared on Si wafer.