Supporting Information

Fig. S1. TGA of the silica core particles without MEMO functionalization (black) and MEMO-functionalized silica particles (red curve). The additional MEMO content was determined after heating the samples at 600°C for additional 30 minutes to be 1.12 wt%.

Fig. S2. DLS investigations of the particles to determine the hydrodynamic diameters and size distributions of the silica core and silica@PSAN core-shell particles.

Table S1. Comparison of average particle diameters obtained by TEM (dTEM) and DLS (dDLS) measurements for silica and silica@PSAN particles.

<table>
<thead>
<tr>
<th>Sample</th>
<th>dTEM [nm]</th>
<th>dDLS [nm]</th>
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<tbody>
<tr>
<td>silica</td>
<td>169 ± 5</td>
<td>172 ± 18</td>
</tr>
<tr>
<td>silica@PSAN</td>
<td>-</td>
<td>222 ± 24</td>
</tr>
</tbody>
</table>

Average particle diameter and standard deviation were determined by taken the mean for at least 200 particles out of the TEM images; Average sphere diameter and standard deviation were determined at the maximum of the logarithmic probability density of the particle size distribution.

Fig. S3. XPS survey spectra of the precursor materials: (i) original melt-sheared particle film without thermal treatment (bottom), (ii) particle film after thermal treatment at 240°C and etching (middle), (iii) particle films after thermal treatment at 400°C (top), and particle film after thermal treatment at 1200°C.

Fig. S4. The evolution of the N1s photoelectron spectrum as a function of thermal treatment of the precursor materials: (i) original melt-sheared particle film without thermal treatment (bottom), (ii) particle film after thermal treatment at 240°C and etching (middle), (iii) particle films after thermal treatment at 400°C (top), and particle film after thermal treatment at 1200°C.
Fig. 55. The evolution of the C1s photoelectron spectrum of the precursor materials: (i) original melt-sheared particle film without thermal treatment (bottom), (ii) particle film after thermal treatment at 240 °C and etching (middle), (iii) particle films after thermal treatment at 400 °C (top), and particle film after thermal treatment at 1200 °C.

Fig. 56. The evolution of the O1s photoelectron spectrum of the precursor materials: (i) original melt-sheared particle film without thermal treatment (bottom), (ii) particle film after thermal treatment at 240 °C and etching (middle), (iii) particle films after thermal treatment at 400 °C (top), and particle film after thermal treatment at 1200 °C.

Fig. 57. (5 x 5) µm² topography (top row) and current maps (bottom row) on a melt-shear organized particle film thermally treated at 1500 °C at different sample potentials as obtained by using conductive AFM measurements.

Fig. 58. High-resolution (1 x 1) µm² topography (top row) and current maps (bottom row) on a melt-shear organized particle film thermally treated at 1500 °C at different sample potentials at a different sample position as obtained by using conductive AFM measurements.