Supplementary Information for

A novel route for polymerisation of thiophene based conducting polymers using trace-free oxidants

Jimy Hadiono So, David Mayevsky, Orawan Winther-Jensen and Bjorn Winther-Jensen*

Figure S1  Kitagawa gas detectors from the chamber containing p-Toluene Sulphonic Acid (PTSa): A) for Toluene detection at 75 °C and 95 °C for one hour without monomer and at 90 °C with bithiophene monomer in the chamber after one hour and B) for SO₂ detection at 95 °C with monomer in the chamber after one hour.

Figure S2  Raman shift of PTTh sample prepared using PTSa at 100 °C for 6 hours
Figure S3  Cyclic voltammograms of PBTh sample prepared using PTSa at 90 °C, Fe(III) PTS at 70 °C and PXSa at 70 °C, scanned in 0.1M tetrabutylammonium hexafluorophosphohate in propylene carbonate in nitrogen glove box.
Table S1   PBTh films polymerised from different sulphur containing acids

<table>
<thead>
<tr>
<th>Sulphur Containing Acid</th>
<th>Structure</th>
<th>Tm ( ºC)</th>
<th>Washed films (polymerised temperature ºC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>p-toluene sulfonic acid (PTSa)</td>
<td><img src="image1.png" alt="Structure" /></td>
<td>105</td>
<td><img src="image2.png" alt="Images" /> (85) (90) (100)</td>
</tr>
<tr>
<td>p-xylene-2-sulfonic acid (PXSa)</td>
<td><img src="image3.png" alt="Structure" /></td>
<td>86</td>
<td><img src="image4.png" alt="Images" /> (80) (70) (60)</td>
</tr>
<tr>
<td>2,4,6-trimethylbenzene-1-sulfonic acid</td>
<td><img src="image5.png" alt="Structure" /></td>
<td>75</td>
<td><img src="image6.png" alt="Images" /> (70) (65) (60)</td>
</tr>
<tr>
<td>Chlorobenzene-Sulfonic Acid</td>
<td><img src="image7.png" alt="Structure" /></td>
<td>102</td>
<td><img src="image8.png" alt="Images" /> (90) (80) (70)</td>
</tr>
</tbody>
</table>