Electronic Supplementary Information

A Novel Post-Polymerization Modification Route to Functional Poly(disubstituted acetylenes) Through Phenol-Yne Click Reaction

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Figure S1. 1H NMR spectra of M2 in chloroform-d. The solvent peak is are marked with asterisks.
Figure S2. $^{13}$C NMR spectra of M2 in chloroform-$d$. The solvent peak is marked with an asterisk.

Table S1 Polymerization of M2 in the presence of transition catalysts$^a$

<table>
<thead>
<tr>
<th>entry</th>
<th>Catalyst</th>
<th>temp. (°C)</th>
<th>yield (%)</th>
<th>$M_w^{b}$</th>
<th>$M_w/M_n^{b}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WCl$_6$-Ph$_4$Sn</td>
<td>90</td>
<td>&lt; 10</td>
<td>920</td>
<td>1.18</td>
</tr>
<tr>
<td>2</td>
<td>WCl$_6$-Ph$_4$Sn</td>
<td>80</td>
<td>&lt; 10</td>
<td>1180</td>
<td>1.26</td>
</tr>
<tr>
<td>3</td>
<td>WCl$_6$-Ph$_4$Sn</td>
<td>60</td>
<td>trace</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>WCl$_6$-Ph$_4$Sn</td>
<td>Rt</td>
<td>trace</td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td>TaCl$_5$-n-Bu$_4$Sn</td>
<td>80</td>
<td>0</td>
<td></td>
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<tr>
<td>6</td>
<td>MoCl$_5$-n-Bu$_4$Sn</td>
<td>80</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$^a$Polymerization were carried in toluene the N$_2$ for 24 h. $[M_2]_0 = 0.2$ M. $[cat] = [co-cat] = 0.02$ M. Catalysts were aged for 10 minutes before initiating the polymerization. $^b$ Determined by GPC in THF on the basis of a polystyrene calibration at 40 °C.
Figure S3. $^1$H NMR M2 in different solvents. The solvent peaks are marked with circles.

Figure S4. $^1$H NMR spectra of precursor polymer P1 in DMSO-d6. The solvent peaks are marked with asterisks.
Figure S5. Fluorescence (FL) spectra of solid films (P1, P3~P6) casted on glass substrates. Excitation at 410 nm.

Figure S6. UV-visible absorption spectra of the polymers in the THF solution (100 μM).
Figure S7. Mass spectrum for M1.

Figure S8. Mass spectrum for M2.
Figure S9. Mass spectrum for M3.

Figure S10. $^1H$ NMR of the modifier para-methoxyphenol propiolate in CDCl$_3$. The solvent peak is marked with an asterisk.
Figure S11. $^{13}$C NMR spectrum of the modifier para-methoxyphenol propiolate in CDCl$_3$. The solvent peak is marked with an asterisk.

Figure S12. $^1$H NMR spectrum for the modifier of para-methoxyl phenyl propiolamide in CDCl$_3$. The solvent peak is marked with an asterisk.
Figure S13. $^{13}$C NMR spectrum for the modifier of para-methoxy phenyl propiolamide in CDCl$_3$. The solvent peak is marked with an asterisk.