

# Nanopatterning of Stable Radical Containing Block Copolymers for Highly Ordered Functional Nanomeshes

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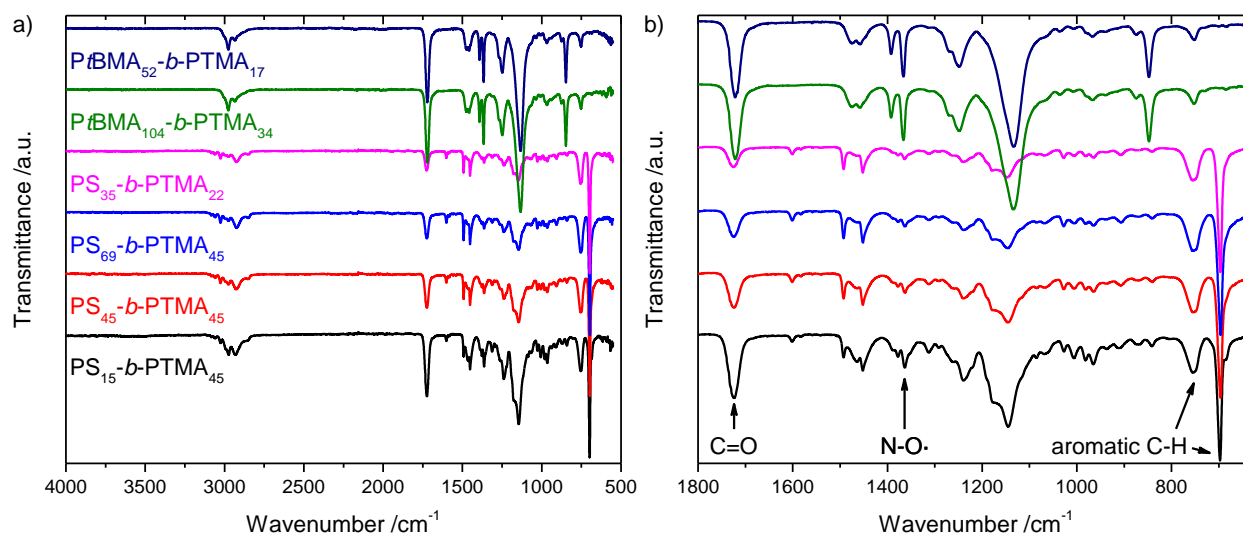
## Supporting Information:

Table SI-1. PtBMA-*b*-PTMA Block Copolymers

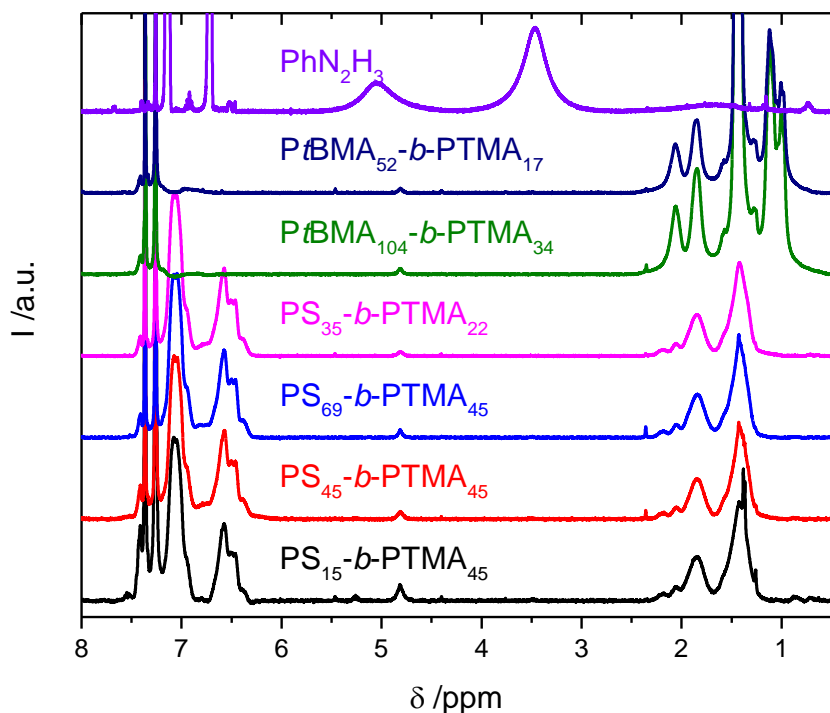
sample	PtBMA block				PTMA block				PtBMA- <i>b</i> -PTMA block copolymer			
	calculated <sup>a</sup>		measured (GPC) <sup>b</sup>		calculated <sup>a</sup>		measured (GPC) <sup>b</sup>		yield /%	M <sub>n,th</sub> <sup>a</sup> /kg mol <sup>-1</sup>	M <sub>n,GPC</sub> <sup>b</sup> /kg mol <sup>-1</sup>	M <sub>w</sub> /M <sub>n</sub> (GPC)
	DP	M <sub>n</sub> /kg mol <sup>-1</sup>	DP	M <sub>n</sub> /kg mol <sup>-1</sup>	DP	M <sub>n</sub> /kg mol <sup>-1</sup>	DP	M <sub>n</sub> /kg mol <sup>-1</sup>				
PTMA <sub>20</sub>	-	-	-	-	84	20.1	54	13.5	77.1	20.1	13.5	1.04
PtBMA <sub>23</sub> - <i>b</i> -PTMA <sub>48</sub>	160	22.8	156	22.2	198	47.6	215	51.6	86.0	70.4	73.8	1.12
PtBMA <sub>23</sub> - <i>b</i> -PTMA <sub>22</sub>	158	22.5	156	22.2	93	22.3	114	27.5	87.4	44.8	49.7	1.05
PtBMA <sub>52</sub> - <i>b</i> -PTMA <sub>22</sub>	364	51.8	372	52.8	93	22.3	129	31.0	95.2	74.1	83.8	1.07
PtBMA <sub>52</sub> - <i>b</i> -PTMA <sub>17</sub>	364	51.8	362	51.5	70	16.7	71	17.1	98.1	68.5	68.5	1.08
PtBMA <sub>104</sub> - <i>b</i> -PTMA <sub>34</sub>	728	103.5	759	107.9	139	33.5	228	54.8	96.4	137.0	162.7	1.13

<sup>a</sup> Degree of polymerization and molecular weight as expected from the amount and ratio of reagents.

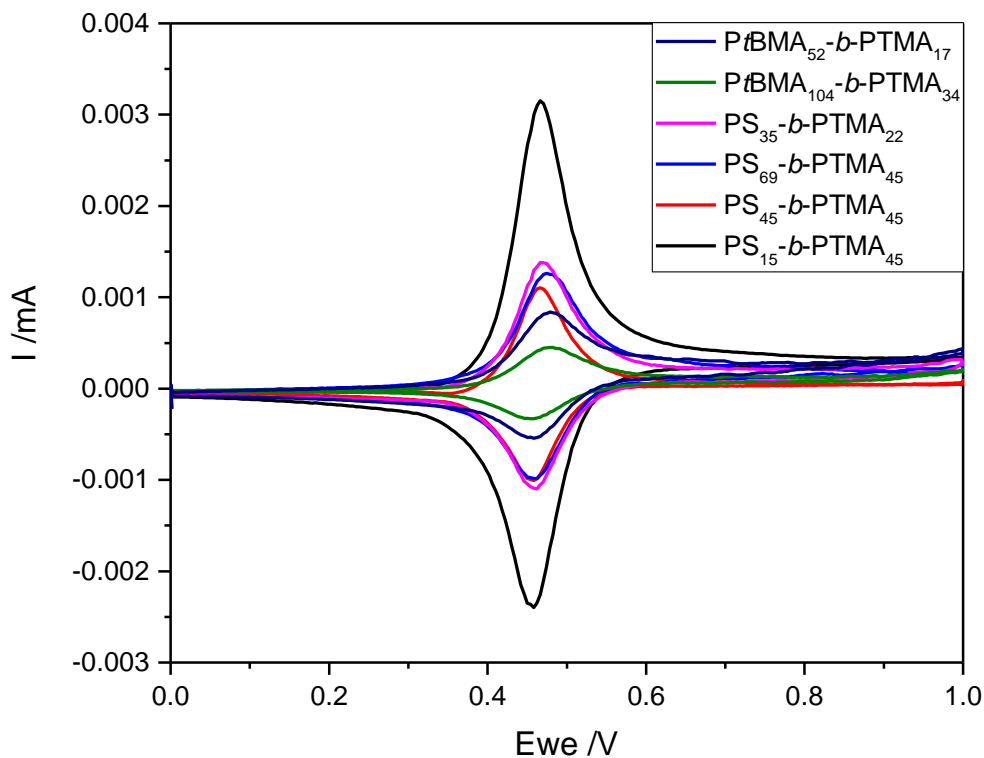
<sup>b</sup> Degree of polymerization and molecular weight as calculated from GPC in THF with a UV-detector.



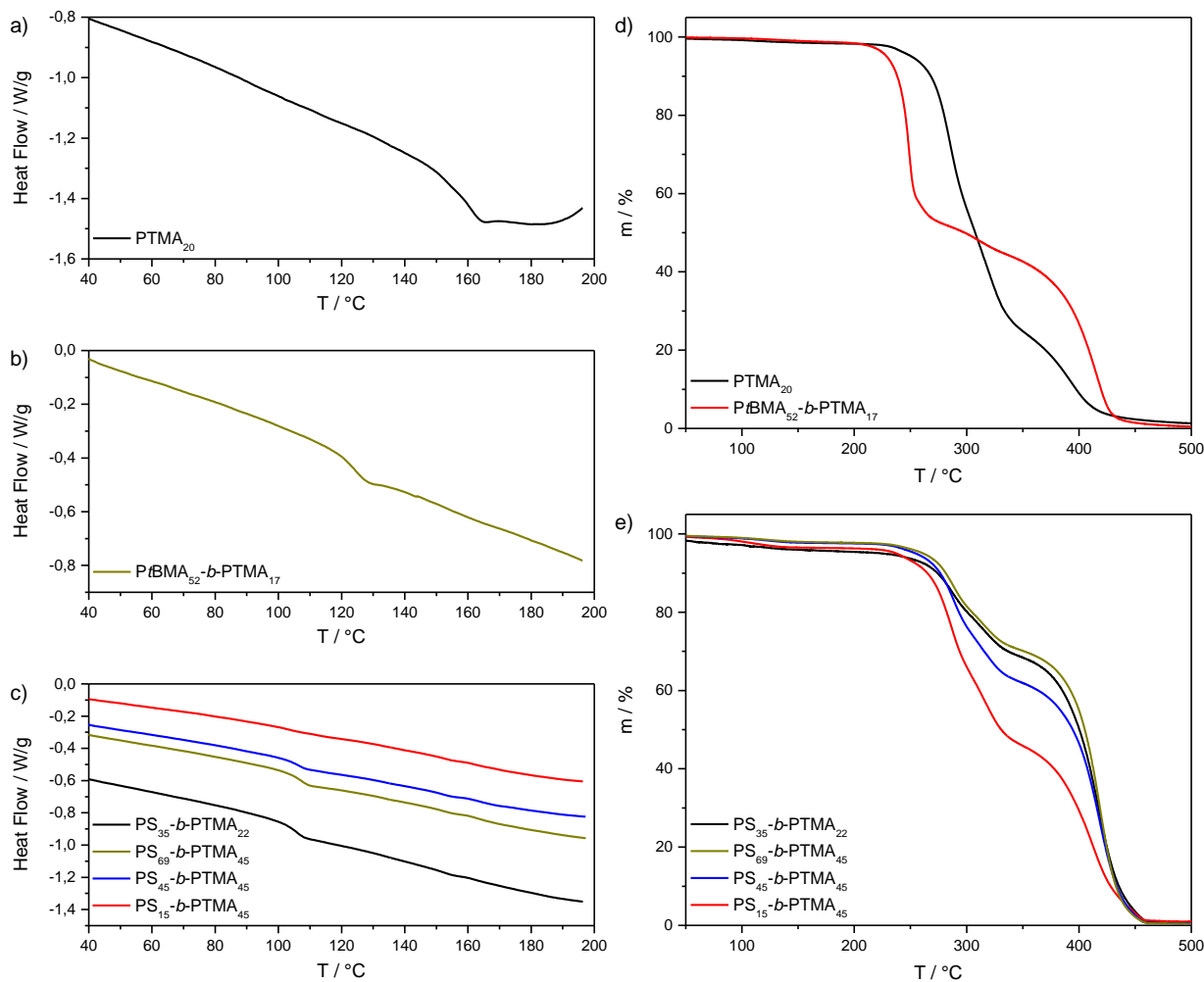
**Figure SI-1.** FT-IR spectra of the polymers described in this contribution. Assignment of the graphs to the individual polymers as denoted in the figure. (b) is a larger magnification of (a). The intensities of the PS-containing polymers were normalized to the out of plane aromatic C-H vibration at 697 cm<sup>-1</sup>.<sup>1-3</sup>



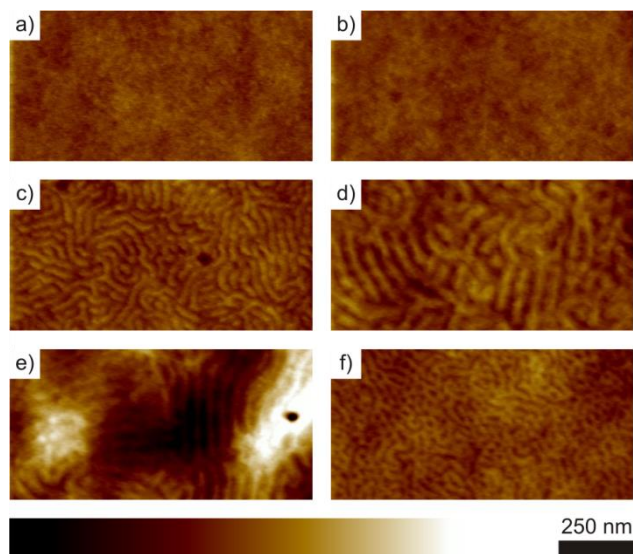
**Figure SI-2.**  $^1\text{H-NMR}$  spectra of the polymers described in this contribution after reduction with phenylhydrazine in  $\text{CDCl}_3$ . Assignment of the graphs to the individual polymers as denoted in the figure.



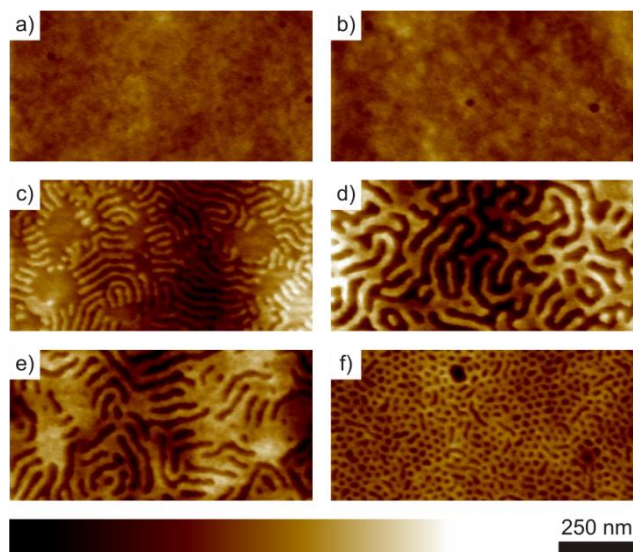
**Figure SI-3.** Cyclic voltammograms of the polymers described in this contribution in acetonitrile with  $\text{NBu}_4\text{PF}_6$  (0.1 M) as auxiliary electrolyte. Assignment of the graphs to the individual polymers as denoted in the figure. WE: GCE, CE: Pt wire, RE:  $\text{Ag/AgNO}_3$  (0.01 M) +  $\text{NBu}_4\text{PF}_6$  (0.1 M) in acetonitrile, scan rate  $100 \text{ mV s}^{-1}$ . The polymers did not completely dissolve in acetonitrile.



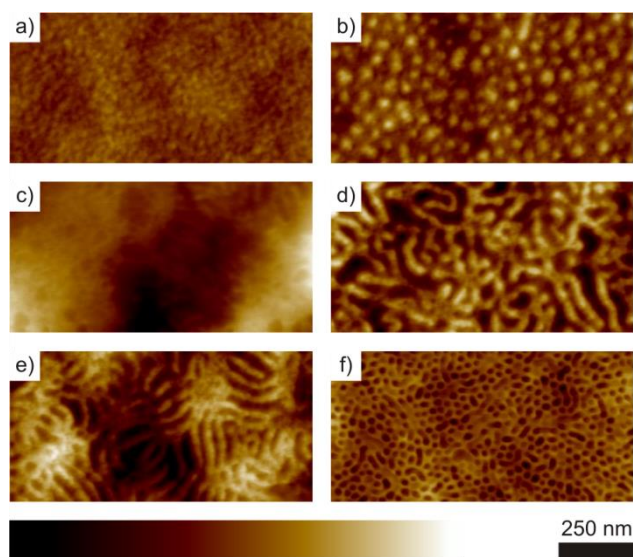
**Figure SI-4.** (a-c) DSC curves of (a) PTMA<sub>20</sub>, (b) PtBMA<sub>52</sub>-*b*-PTMA<sub>17</sub>, and (c) PS<sub>35</sub>-*b*-PTMA<sub>22</sub> (black), PS<sub>69</sub>-*b*-PTMA<sub>45</sub> (green), PS<sub>45</sub>-*b*-PTMA<sub>45</sub> (blue), PS<sub>15</sub>-*b*-PTMA<sub>45</sub> (red). (d, e) TGA curves of (d) PTMA<sub>20</sub> (black), PtBMA<sub>52</sub>-*b*-PTMA<sub>17</sub> (red), and (e) PS<sub>35</sub>-*b*-PTMA<sub>22</sub> (black), PS<sub>69</sub>-*b*-PTMA<sub>45</sub> (green), PS<sub>45</sub>-*b*-PTMA<sub>45</sub> (blue), PS<sub>15</sub>-*b*-PTMA<sub>45</sub> (red).



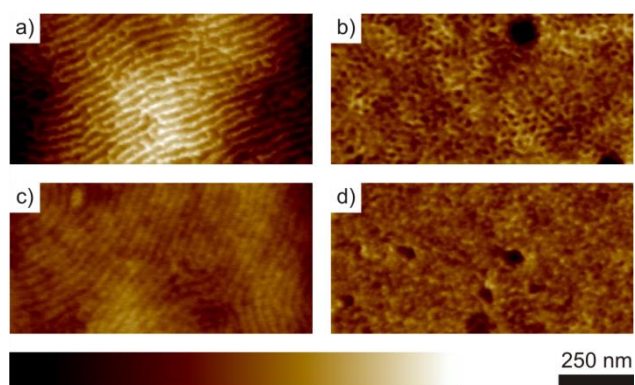
**Figure SI-5.** AFM topography images of (a) PtBMA<sub>52</sub>-*b*-PTMA<sub>17</sub>, (b) PtBMA<sub>104</sub>-*b*-PTMA<sub>34</sub>, (c) PS<sub>35</sub>-*b*-PTMA<sub>22</sub>, (d) PS<sub>69</sub>-*b*-PTMA<sub>45</sub>, (e) PS<sub>45</sub>-*b*-PTMA<sub>45</sub>, and (f) PS<sub>15</sub>-*b*-PTMA<sub>45</sub> after spin-coating from solutions in chloroform. The color coding bar ( $\Delta z = 7.5$  nm) and scale bar correspond to all images.



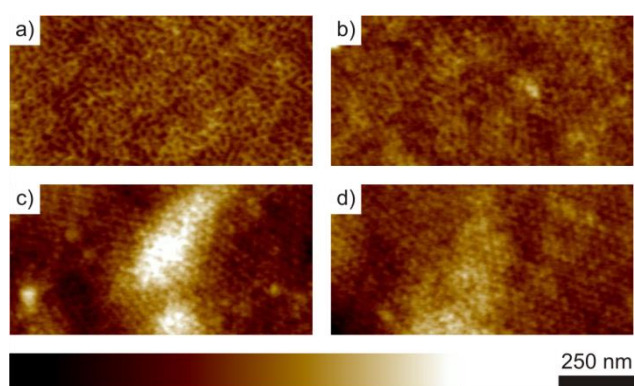
**Figure SI-6.** AFM topography images of (a)  $PtBMA_{52}\text{-}b\text{-}PTMA_{17}$ , (b)  $PtBMA_{104}\text{-}b\text{-}PTMA_{34}$ , (c)  $PS_{35}\text{-}b\text{-}PTMA_{22}$ , (d)  $PS_{69}\text{-}b\text{-}PTMA_{45}$ , (e)  $PS_{45}\text{-}b\text{-}PTMA_{45}$ , and (f)  $PS_{15}\text{-}b\text{-}PTMA_{45}$  after spin-coating from solutions in chloroform and subsequent thermal annealing at 200 °C for 20 min. The color coding bar ( $\Delta z = 10$  nm) and scale bar correspond to all images.



**Figure SI-7.** AFM topography images of (a)  $PtBMA_{52}\text{-}b\text{-}PTMA_{17}$ , (b)  $PtBMA_{104}\text{-}b\text{-}PTMA_{34}$ , (c)  $PS_{35}\text{-}b\text{-}PTMA_{22}$ , (d)  $PS_{69}\text{-}b\text{-}PTMA_{45}$ , (e)  $PS_{45}\text{-}b\text{-}PTMA_{45}$ , and (f)  $PS_{15}\text{-}b\text{-}PTMA_{45}$  after spin-coating from solutions in chloroform and subsequent thermal annealing at 200 °C for 150 min. The color coding bar ( $\Delta z = 10$  nm, except (c)  $\Delta z = 20$  nm) and scale bar correspond to all images.



**Figure SI-8.** AFM topography images of PS<sub>15</sub>-*b*-PTMA<sub>45</sub> films after spin-coating from chloroform (a, b) or toluene (c, d) and subsequent solvent vapor annealing in chloroform (a, c) or toluene vapor (b, d). The color coding bar ( $\Delta z = 7.5$  nm) and scale bar correspond to all images.



**Figure SI-9.** AFM topography images of PS<sub>15</sub>-*b*-PTMA<sub>45</sub> films after spin-coating from toluene and subsequent solvent vapor annealing in chloroform. Changing film thickness as a result of different concentration of the spin-coating solution: (a) ~19, (b) ~43, (c) ~85, (d) ~253 nm. The color coding bar ( $\Delta z = 5$  nm) and scale bar correspond to all images.

## References

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