

Supplementary Material

Synthesis of Polymers: Bifunctional coupler (2), PTHFAz^{Pz}₃ (3), PTHFAz^{Pz}₅ (4) were synthesized as described in the literature [1].

Table S1. Colour values (CIELAB) for cotton samples after staining test (CIELAB colour scale, Datacolor measurement after Lanazol test): (differences in the colour space correspond to visual differences; CIELAB colour space is organized in a cube form: L^* axis from top to bottom, maximum is 100 which is a perfect white and Zero which represents black. a^* and b^* axes have no numerical limits; positive a^* is red, negative a^* is green; positive b^* is yellow, negative b^* is blue. Delta values indicate how much a standard and a sample differ from one another ($\Delta L^* = L^*_{\text{sample}} - L^*_{\text{standard}}$). Negative Delta L^* means: sample is darker than the standard (untreated standard cotton); negative Delta b^* means: sample is darker blue compared to the standard [2].

Polymer Used for Coating (Condition)	L^*	b^*	Delta L^*	Delta b^*
Standard Cotton	89.39	0.53	—	—
PTHFAz ^{Pz} ₃ (0.5 %owf, pH 5.5, 50 °C)	60.92	−27.33	−28.46	−27.86
PTHFAz ^{Pz} ₃ (0.5% owf, pH 5.5, 150 °C)	62.30	−25.19	−27.09	−25.72
PTHFAz ^{Pz} ₃ (0.35%, pH 5.5, 50 °C)	66.84	−21.66	−22.55	−22.19
PTHFAz ^{Pz} ₃ (0.35%, pH 5.5, 150 °C)	63.82	−23.15	−25.57	−23.68
PTHFAz ^{Pz} ₃ (0.5% owf, pH 8.5, 50 °C)	61.04	−28.01	−28.34	−28.54
PTHFAz ^{Pz} ₃ (0.5% owf, pH 8.5, 150 °C)	68.15	−21.53	−21.24	−22.06
PTHFAz ^{Pz} ₃ (0.35%, pH 8.5, 50 °C)	62.51	−25.88	−26.88	−26.41
PTHFAz ^{Pz} ₃ (0.35%, pH 8.5, 150 °C)	62.85	−25.87	−26.53	−26.40
Standard PET	89.16	0.82	—	—
PTHFAz ^{Pz} ₃ (0.5% owf, pH 8.9, 50 °C)	64.88	−22.05	−24.27	−22.86
PTHFAz ^{Pz} ₃ (0.5% owf, pH 8.9, 150 °C)	66.32	−20.27	−22.84	−21.09
PTHFAz ^{Pz} ₃ (1.0%, pH 8.9, 50 °C)	70.70	−16.83	−18.46	−17.65
PTHFAz ^{Pz} ₃ (1.0%, pH 8.9, 150 °C)	54.87	−27.04	−34.29	−27.86

Table S2. Antimicrobial efficacy of cotton and polyester fabrics finished with PTHFAz^{Pz}₃ at pH 8.5 (*E. coli* 2.6×10^6 and *S. aureus* 2.4×10^6 CFU/mL due to exposure on the polymer coated surface (thermal oven at 100 °C, temperature was enhanced to 150 °C over 15 min, at 150 °C additional curing for 2 min; alternatively drying was performed at 50 °C).

Drying Temperature after Padding	Bacterial Growth Inhibition (%) of Polymer Coated Cotton Containing Different Amounts of Polymer on the Surface		Bacterial Growth Inhibition (%) of Polymer Coated PET Containing Different Amounts of Polymer on the Surface	
	0.35 %owf	0.50 %owf	0.50%owf	1.0 %owf
<i>E. coli</i>				
50 °C	99.99	100	99	99.999
100/150 °C	99.9	100	99.9999	99.9999–99.99999
<i>S. aureus</i>				
50 °C	0	90–99	0	99.9
100/150 °C	0	90	0	99.999

Figure S1. Lanasol dye test of polymer coated cotton fabrics: before and after washing (polymers in 0.5 %owf).

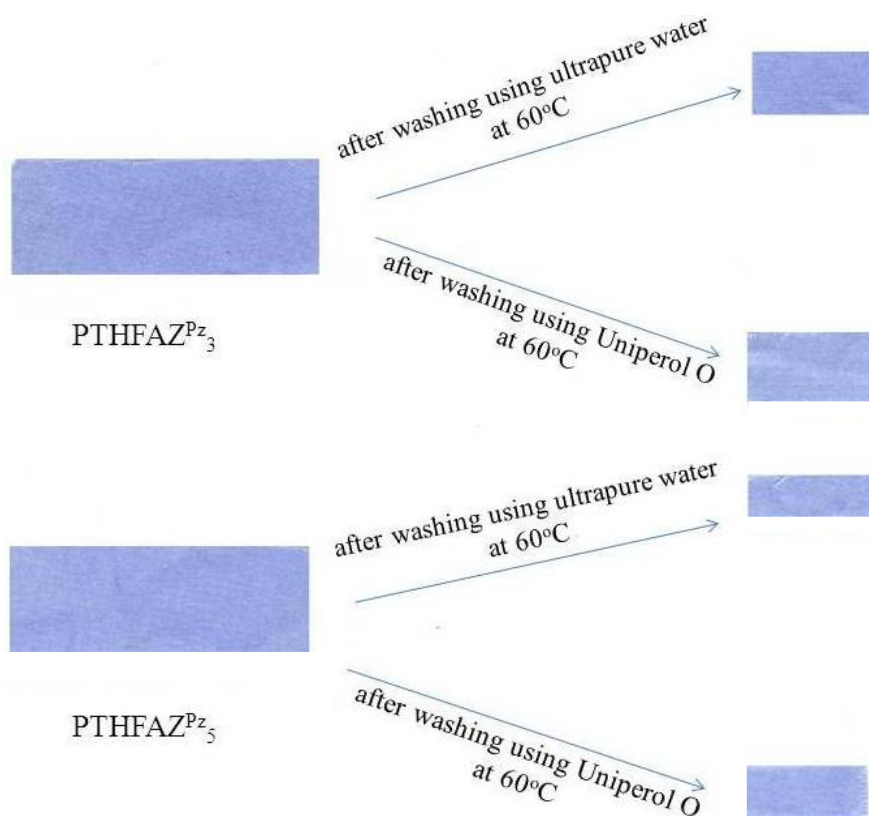


Table S3. Antimicrobial efficacy of cotton and polyester fabrics finished with PTHFAZ^{Pz}₃ at pH 8.5 (*E. coli* 2.6×10^6 and *S. aureus* 2.4×10^6 CFU/mL due to polymer leached into the exposure solution (thermal oven at 100 °C, temperature was enhanced to 150 °C over 15 min, at 150 °C additional curing for 2 min; alternatively drying was performed at 50 °C).

Drying Temperature after Padding	Bacterial Growth Inhibition (%) of Polymer Coated Cotton Containing Different Amounts of Polymer on the Surface by Polymers Leaching to the Exposure solution		Bacterial Growth Inhibition (%) of Polymer Coated PET Containing Different Amounts of Polymer on the Surface by Polymers Leaching to the Exposure Solution	
	0.35 %owf	0.50 %owf	0.50 %owf	1.0 %owf
	<i>E. coli</i>			
50 ℃	<50	<<90	0	0
100/150 ℃	0	<<50	0	0
<i>S. aureus</i>				
50 ℃	0	<50	0	0
100/150 ℃	0	<50	0	0

References

1. Chattopadhyay, S.; Keul, H.; Möller, M. Synthesis of azetidinium-functionalized polymers using a piperazine based coupler. *Macromolecules* **2013**, *46*, 638–646.
2. Application notes. Available online: www.hunterlab.com/an-1005b.pdf (accessed on 21 May 2014).