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## **Electronic Supplementary Information**

## Multi-functional wool fabric by graft-copolymerisation with

## polystyrene sulphonate: Enhanced fire retardancy,

## mechanical properties, and stain-resistance

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Scheme S1. Schematic diagram of grafting of pSS onto wool fibre.



**Fig. S1**. Optical images of control wool fabric (a), and also wool fabric grafted with 10 (b), 15 (c), 20 (d), and 25% (e) pSS.

Samples	L*	a*	b*	Delta E	Colour strength
					(K/S)
Control	58.6	38.4	13.5	46.5	2.71
10% pSS	66.8	33.3	12	39.2	1.95
15% pSS	67.1	33.2	12.3	38.9	1.75
20% pSS	68.1	31.5	11.4	37.5	1.70
25% pSS	69.1	30.7	11.7	37.1	1.68

**Table S1.** CIE L\*a\*b\* values and color strength of control wool fabrics and also wool fabricsgrafted with various concentrations of pSS stained with C.I. Acid Red 40.

**Table S2.** Volume and surface resistivity of control and pSS grafted wool fabrics without andtreated with 0.5% owf AgNO3.

Samples	Without silver treatment		With silver treatment	
	Surface resistivity	Volume resistivity	Surface resistivity	Volume resistivity
	(Ω-cm)	(Ω-cm)	(Ω-cm)	(Ω-cm)
Control	3.29×10 <sup>11</sup>	2.10×10 <sup>12</sup>	2.67×10 <sup>11</sup>	$1.90 \times 10^{12}$
10% pSS	3.24×10 <sup>11</sup>	$1.42 \times 10^{12}$	2.57×10 <sup>11</sup>	1.81×10 <sup>12</sup>
15% pSS	4.53×10 <sup>11</sup>	1.65×10 <sup>12</sup>	3.65×10 <sup>11</sup>	2.09×10 <sup>12</sup>
20% pSS	3.44×10 <sup>11</sup>	1.64×10 <sup>12</sup>	4.43×10 <sup>11</sup>	2.56×10 <sup>12</sup>
25% pSS	3.90×10 <sup>11</sup>	1.90×10 <sup>12</sup>	3.37×10 <sup>11</sup>	2.15×10 <sup>12</sup>