ADVANCED MATERIALS INTERFACES

Supporting Information

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Smoldering and Flame Resistant Textiles via Conformal Barrier Formation

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Supporting Information

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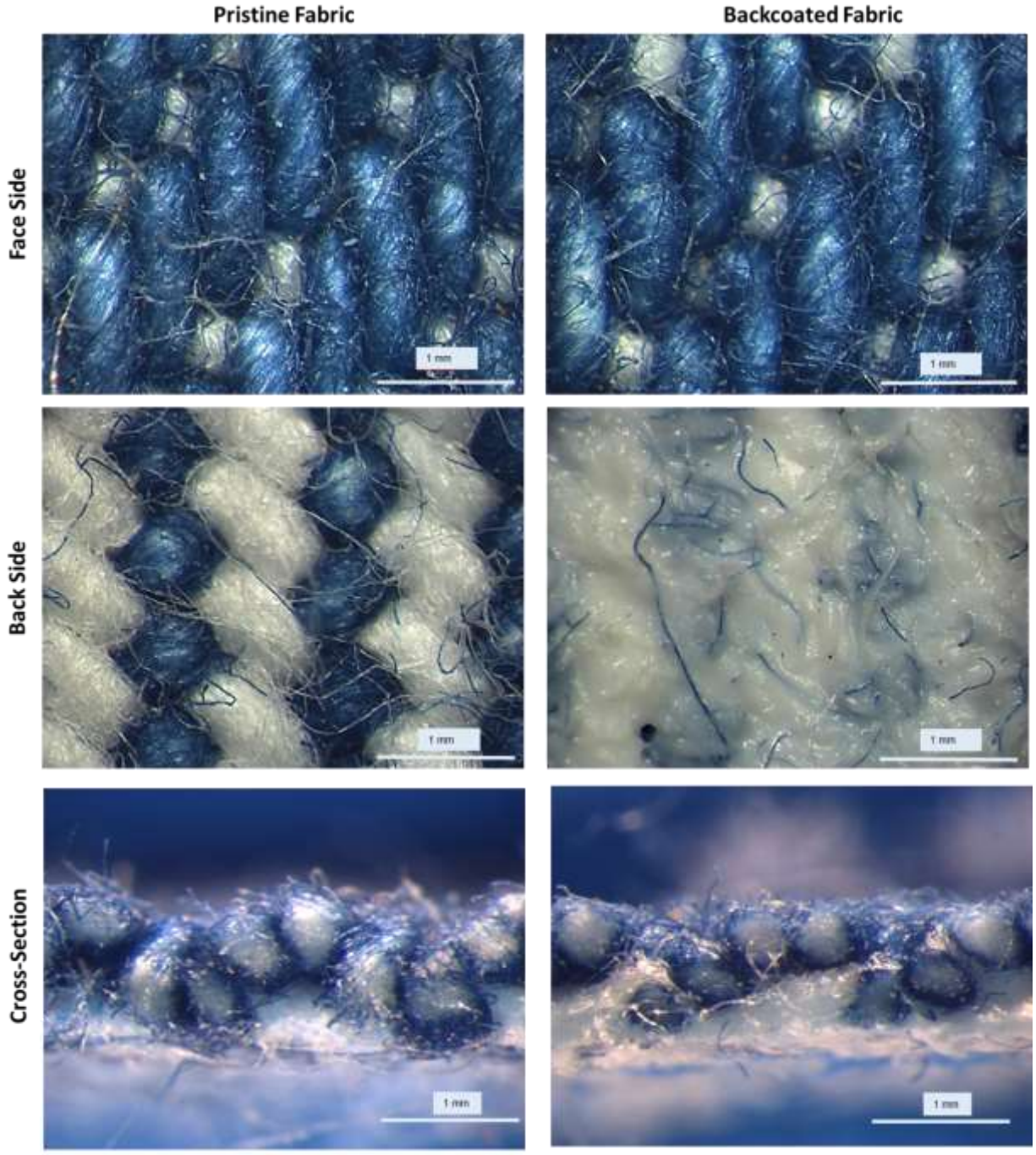

Figure S1. Images of the face side, back side and cross-section for the pristine fabric and backcoated fabric (vATH-Fabric).

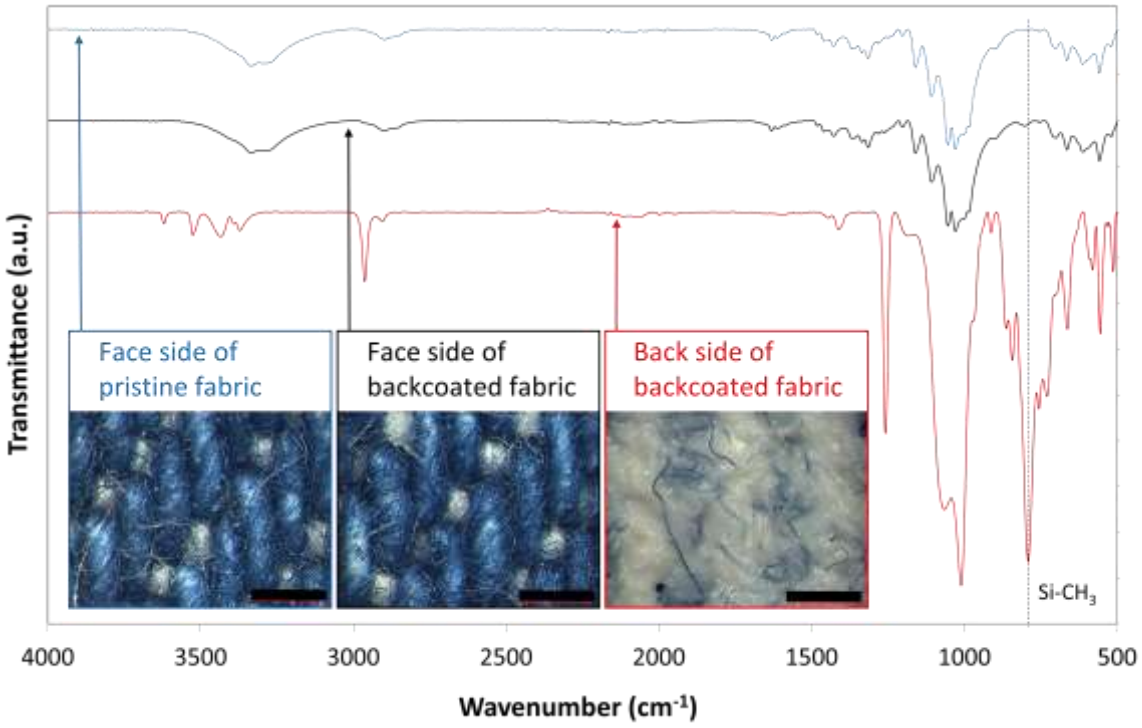

Figure S2. FTIR data for the pristine fabric (face side only) and for the backcoated fabric (face and back side). Data are translated vertically for clarity. The insets show the optical micrographs of the analyzed samples (the scale bars represents 1 mm).

Fourier transform infrared (FTIR) data are shown in Figure S2. On the back side, the backcoated fabric (BCF) has a sharp peak at 790 cm^{-1} that is associated to the Si-CH_3 stretching of the silicone binder. The same peak is absent on the face side of the pristine fabric and is barely detectable on the face side of the BCF (likely due to small inter-yarn gaps exposing the BC to the infrared beam).

Figure S3. Backcoating residue after microscale combustion calorimetry. There is no surface manifestations of liquefaction (the sharp edges are incompatible with a liquefied material).

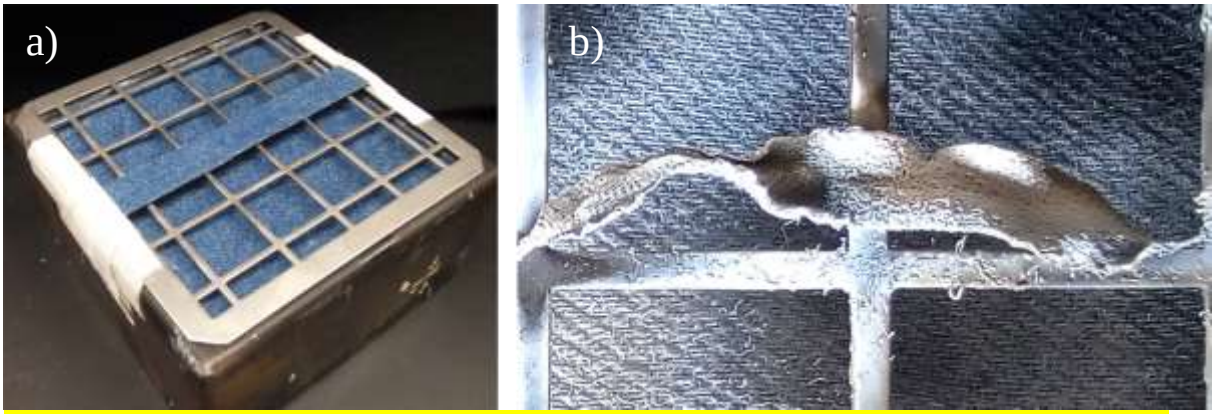

Figure S4. Picture of a cone calorimeter sample where a strip of pristine uncoated fabric is layed on top of a steel mesh. A gap of about 6 mm is maintained between the fabric strip and the underlying BCF (a). Picture showing a closeup of the residue of combustion of the fabric strip after cone calorimetry (b). A whitish conformal coating is generated on the charred strip even without direct contact with the silicone backcoating.

Table S1. Microscale combustion calorimetry data for BC formulations.

Sample	Residue [%]	THR [kJ g^{-1}]	PHRR [W g^{-1}]	T_{PHRR} [°C]
noATH	0.4 ± 0.1	16.1 ± 2.0	82.0 ± 6.7	602 ± 17
ATH	71.9 ± 0.6	4.4 ± 0.1	19.7 ± 1.3	530 ± 2
vATH	72.2 ± 0.9	4.4 ± 0.2	20.1 ± 0.7	528 ± 3

As shown by microscale combustion calorimetry in Table S1, the BC formulations with standard aluminum hydroxide (ATH) and with vinylsilane-functionalized aluminum hydroxide (vATH) show comparable values for the total heat released (THR), the peak of heat release rate (PHRR) and the temperature at which the PHRR occurs (T_{PHRR}). Both ATH and vATH show a reduction of about 75 % for THR and PHRR as compared to the BC formulation without aluminum hydroxide (noATH).