Supplemental Information

ZnO microstructures as flame retardant coatings on cotton fabrics

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Table SI 1. The final residue of samples after combustion

	Residue mass (g)	Residue percentage (%)
Scoured cotton	0.692	6.06
ZnO microparticles	0.596	5.31
ZnO + ZnS microparticles	0.616	5.08
ZnO seeds	0.873	7.71
ZnO short rods	1.71	14.3
ZnO rods	9.62	49.1
ZnO/ZnS rods	9.41	48.0

Table SI 2. The smoke data of samples from cone calorimeter

	Mean SEA (m^2/kg)	Total Smoke Release (m^2/m^2)
Scoured cotton	13.76 (2.1)	16.06 (1.9)
ZnO microparticles	10.25 (0.44)	9.900 (2.1)
ZnO + ZnS microparticles	8.200 (1.1)	12.13 (0.32)
ZnO seeds	10.90 (2.5)	12.60 (2.1)
ZnO rods	6.583 (2.3)	7.433 (2.9)
ZnO/ZnS rods	6.756 (1.9)	7.867 (2.0)

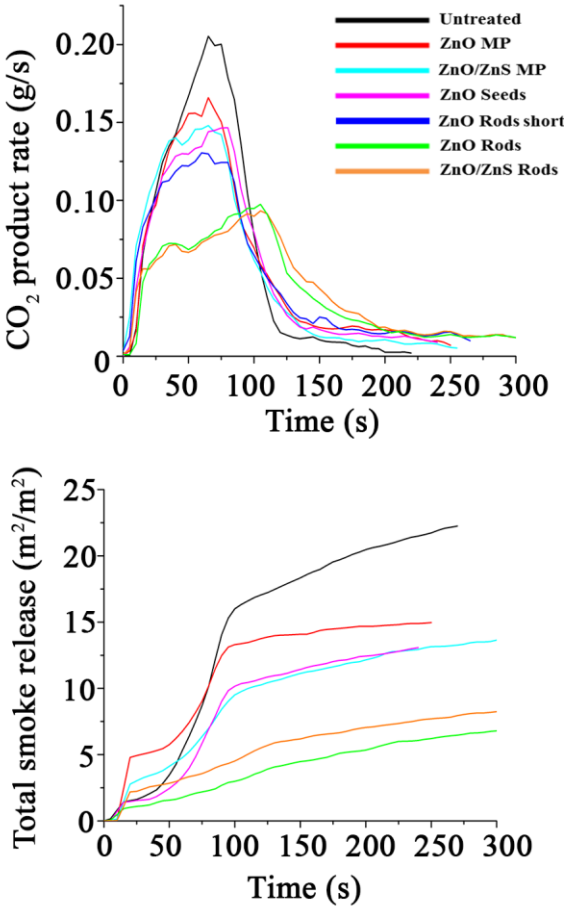

Figure SI 1 Samples were tested on the cone calorimeter and CO_2 product rate (top) and total smoke release (bottom) graphs were generated.

After ignition, the total smoke release (TSR) increased rapidly within the first 15 to 20 s. After a slight reduction in the subsequent 20 to 25 s, the TSR rapidly increased again until 100 s. This data is consistent with the PkHRR of the materials. At around 75 s, the TSR of untreated cotton samples surpasses all others. Cotton samples coated by ZnO and ZnO/ZnS rods had the lowest TSR.

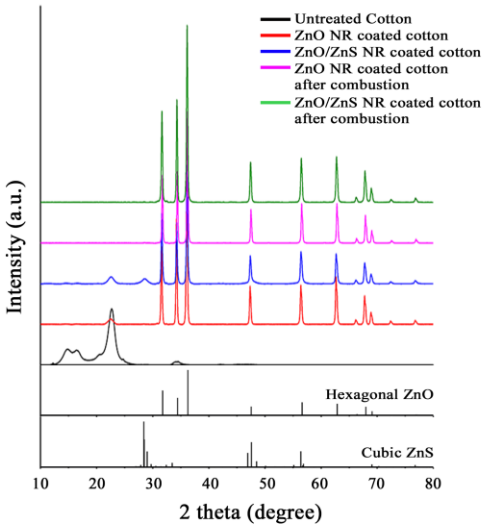

Figure SI 2. XRD pattern of ZnO and ZnO/ZnS nanorods coated samples before and after combustion.

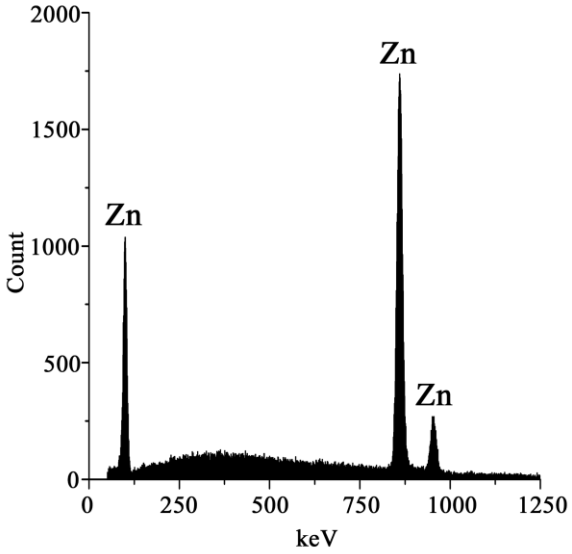

Figure SI 3. Energy dispersive X-Ray spectrum of ZnO/ZnS rod coated cotton sample after combustion. Sulfur is converted to SO_2 gas, leaving no trace of sulfur behind.

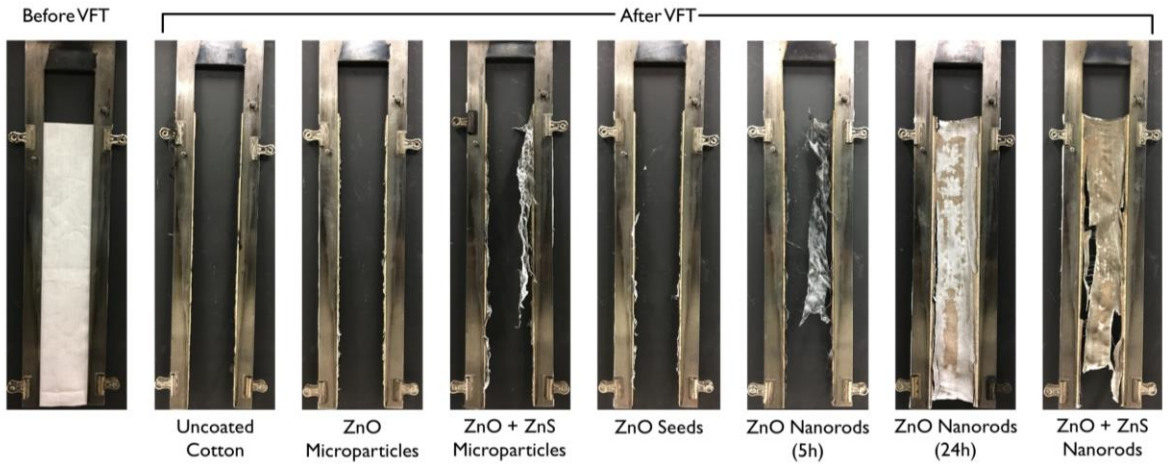

Figure SI 4. Pictures of untreated and treated cotton fabrics before and after vertical flame tests.