

Supplementary File

Construction strategy of flexible and breathable SiO₂/Al/NFs/PET composite fabrics with dual shielding against microwave and infrared-thermal radiations for wearable protective clothing

Hui Ye ^{1,2}, Qiongzhen Liu ^{1,2*}, Xiao Xu ^{1,2}, MengYa Song ^{1,2}, Ying Lu ^{1,2}, Liyan Yang ^{1,2}, Wen Wang ^{1,2}, Yuedan Wang ^{1,2}, Mufang Li ^{1,2}, Dong Wang ^{1,2*}

¹ Key Laboratory of Textile Fiber and Products, Ministry of Education, Wuhan Textile University, Wuhan 430200, China

² Hubei International Science and Technology Cooperation Base for Intelligent Textile Material Innovation & Application, Wuhan Textile University, Wuhan 430200, China

***Corresponding Author:** Qiongzhen Liu, windlqz_2000@163.com; Wang Dong, wangdon08@126.com

List of Figures:

Figure S1. Changes in thickness and surface roughness for (a-b) Al films and (c-d) SiO₂ films sputtered on a glass substrate with respect to sputtering time.

Figure S2. Influence of the relative humidity on the electromagnetic shielding effectiveness of the S4-1 fabric: (a) SE_T, (b) SE_R, and (c) SE_A.

Table S1. IR temperature variations between the test fabric specimens and the hot plate center.

Figure S3. UV-Vis-NIR spectra of the various SiO₂/Al/NFs/PET fabrics with different surface arrays: (a) reflectivity, and (b) transmissivity.

Movie S1. A movie showing water vapor in a closed container penetrating through a SiO₂/Al/NFs/PET fabric, proving the breathability of the fabric.

Figure S4. The SiO₂/Al/NFs/PET conductive fabric (S4-1) showing asymmetric surface wetting properties toward water with (a) hydrophilic PET side and (b) hydrophobic coating side.

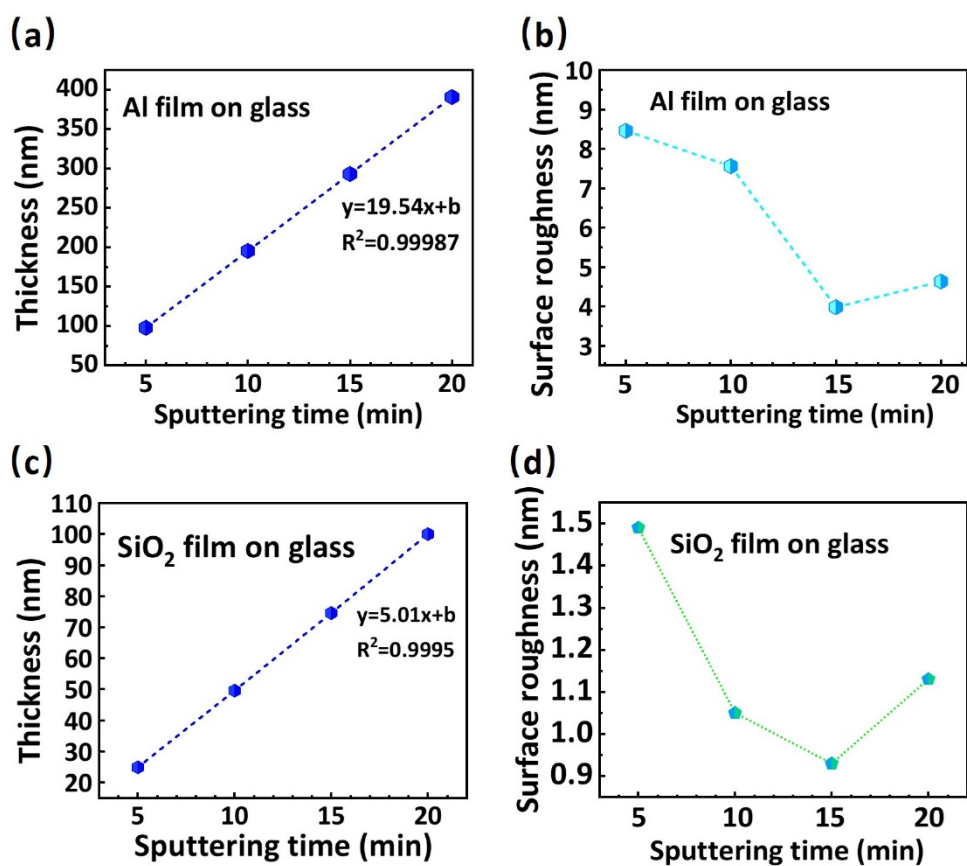


Figure S1. Changes in thickness and surface roughness for (a-b) Al films and (c-d) SiO₂ films sputtered on a glass substrate with respect to sputtering time.

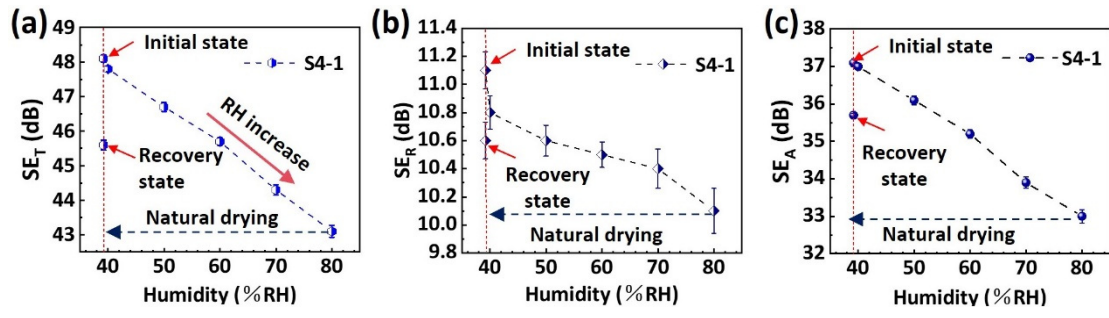


Figure S2. Influence of the relative humidity on the electromagnetic shielding effectiveness of the S4-1 fabric: (a) SE_T , (b) SE_R , and (c) SE_A .

Table S1. IR temperature variations between the test fabric specimens and the hot plate center.

Fabric samples	IR temperature of samples (°C)	Hot stage temperature (°C)	ΔT (°C)
S4	20.4		-24.6
S4-1	20.1		-24.9
S4-1-1	19.6		-25.4
S4-1-1.5	19.2	45	-25.8
S4-1-6	18.8		-26.2
S4-1-7.5	18.4		-26.6
S4-1-9	18.4		-26.6

Note: ΔT denotes the IR temperature variation between the test fabric specimen and the hot plate center

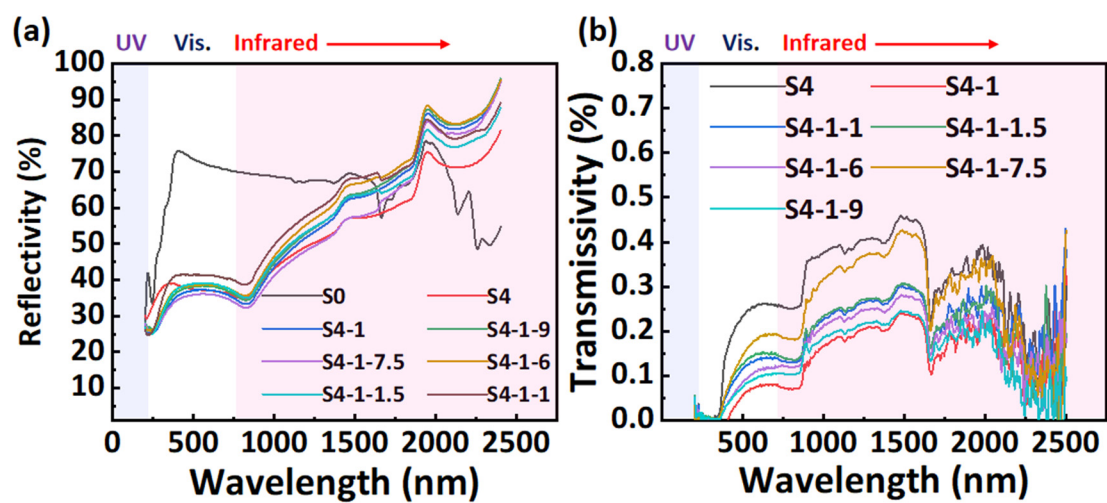


Figure S3. UV-Vis-NIR spectra of the various $\text{SiO}_2/\text{Al}/\text{NFs}/\text{PET}$ fabrics with different surface arrays: (a) reflectivity, and (b) transmissivity.

Movie S1. A movie showing water vapor in a closed container penetrating through a $\text{SiO}_2/\text{Al}/\text{NFs}/\text{PET}$ fabric, proving the breathability of the fabric.

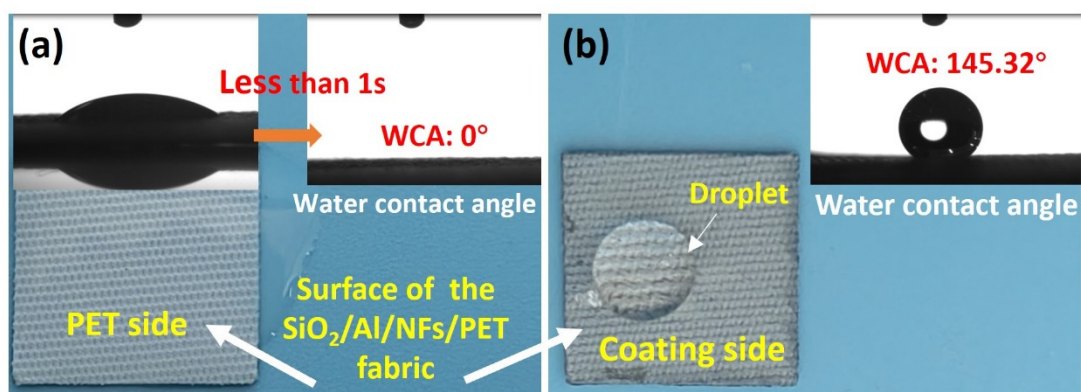


Figure S4. The $\text{SiO}_2/\text{Al}/\text{NFs}/\text{PET}$ conductive fabric (S4-1) showing asymmetric surface wetting properties toward water with (a) hydrophilic PET side and (b) hydrophobic coating side.