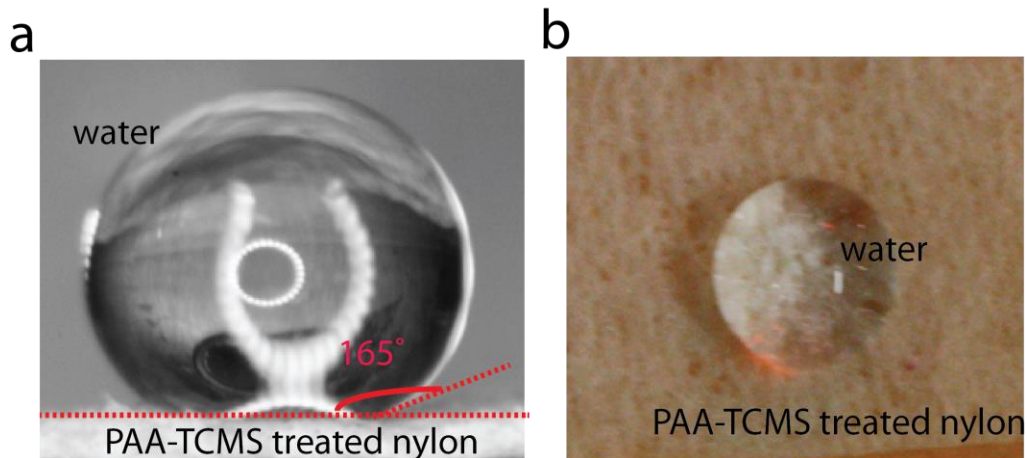


*Supplementary Information*

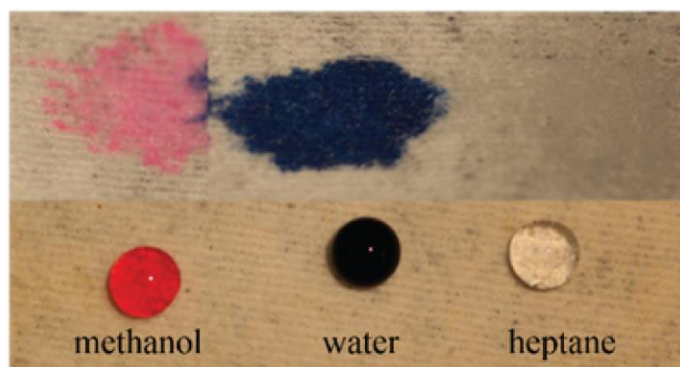
**Design of Abrasion Resistant Super-Antiwetting Nylon Surfaces**

Guoqing Li<sup>1</sup>, Hoon Joo Lee<sup>1,2</sup>, and Stephen Michielsen<sup>1\*</sup>

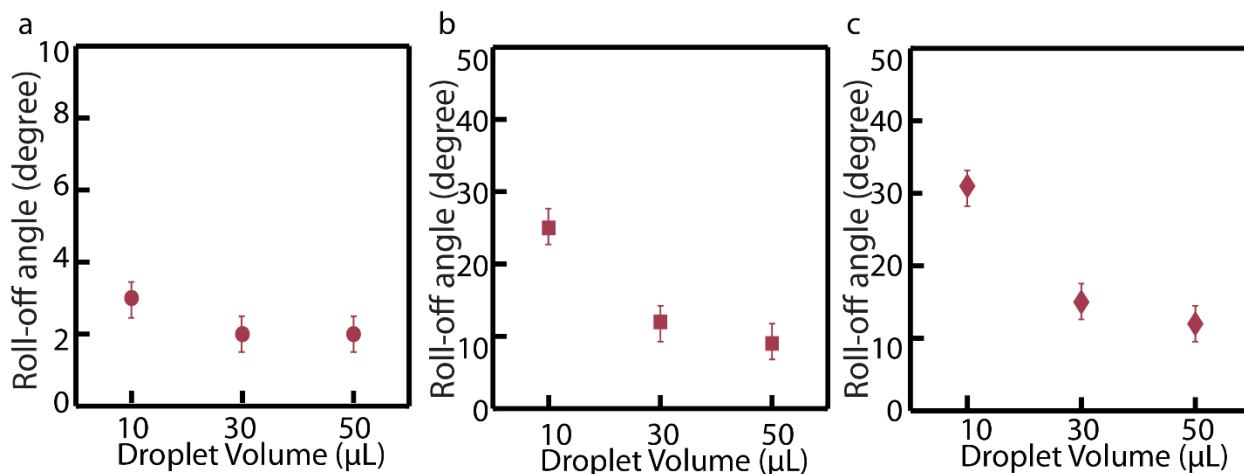
<sup>1</sup>College of Textiles, North Carolina State University, Raleigh, NC 27695, USA; <sup>2</sup>Nike, Inc. Beaverton, USA



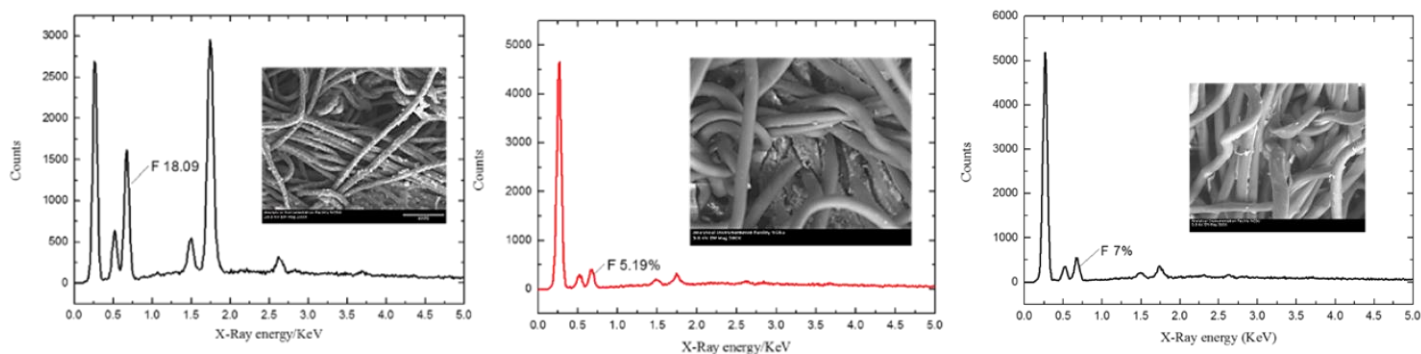
Supplementary Figure S1: The water droplets on a PAA-TCMS treated nylon fabric. (a) Photograph of a water droplet on the PAA-TCMS treated nylon fabric. The image was used to measure the value of the contact angle. (b) Photograph of a water droplet on PAA-TCMS treated nylon fabric with a spherical shape.



Supplementary Figure S2: The photographs of water, heptane and methanol droplets on nylon fabrics before and after treatment. Before the treatment, nylon fabric can be easily wetted by water, methanol, and heptane droplets. While after treatment, all these tested droplets stand on the treated nylon surface with a spherical shape.



Supplementary Figure S3: The effect of droplet volume tested in the measurement on the roll-off angles of water, dodecane, and methanol droplets on treated nylon surface. The roll off angle of (a) water droplets, (b) dodecane droplets and (c) methanol droplets with different volume on treated nylon fabrics.

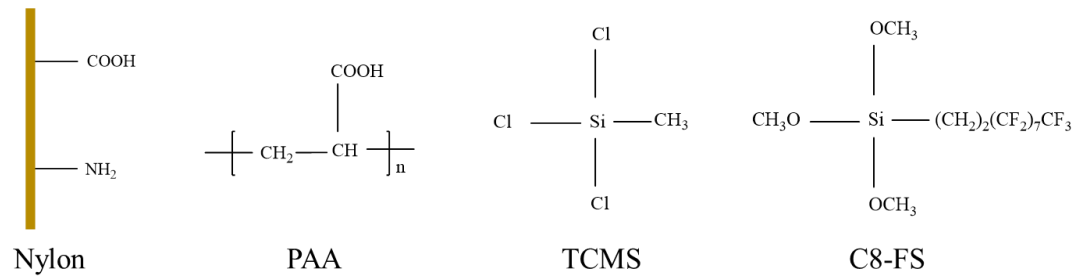


Supplementary Figure S4: The EDX spectrum of F-atoms on the nylon fabric surface at different abrasion test stage.

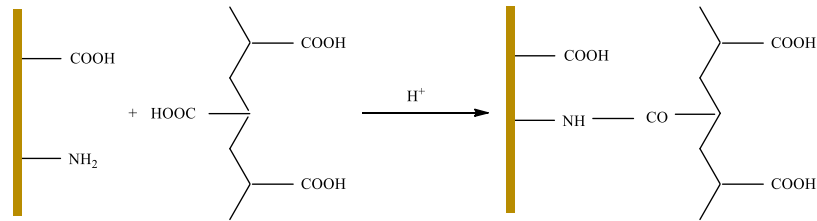
Supplementary Table T1: The surface tension values of different tested fluids.

Liquids	Surface tension mN/m
Water	72.80
Glycerol	64.00
Benzylalcohol	30.00
Kaydol	31.50
n-Decane	23.83
Dodecane	25.35
methanol	22.70
acetone	25.20
hexane	18.43
heptane	20.14

Supplementary scheme I: The mechanism of the treatment is listed as followings and added to supporting information.

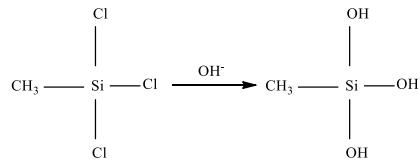


1<sup>st</sup>. Attach PAA onto nylon fabric surface.

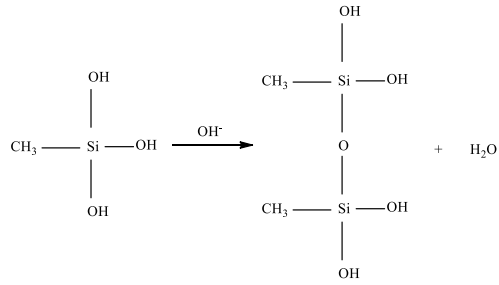


2<sup>nd</sup>: TCMS treatment of PAA-nylon

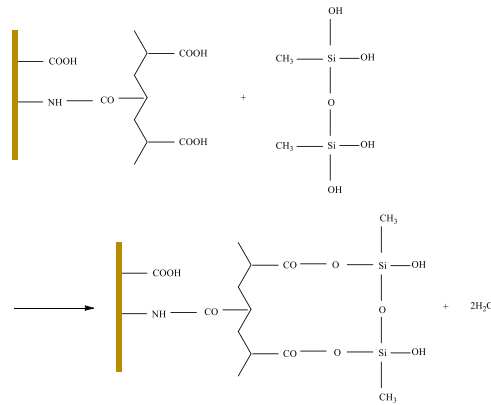
i. Hydrolysis of TCMS



ii. Formation of network between hydrolyzed TCMS

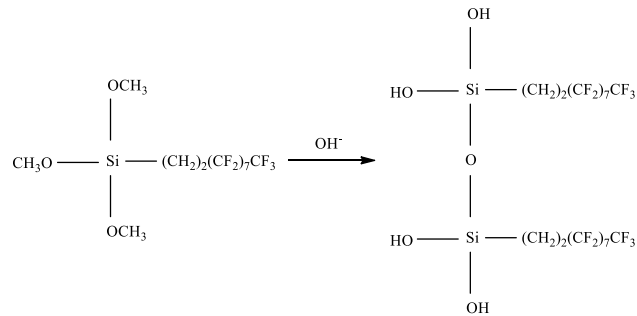


iii. Formation of network onto the PAA treated nylon surface, that cannot be dissolved in solvents, leading to formation of particles.



3<sup>rd</sup>: C8-FS coating on TCMS-PAA-nylon fabric.

i. Formation of network between hydrolyzed FS



ii. Formation of network onto the TCMS-PAA-nylon surface

