

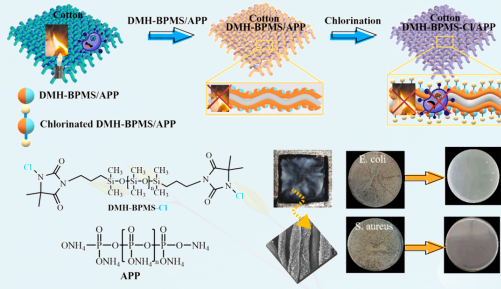
# Institute of Functional Textiles and Advanced Materials

## Developing flame-retardant, antibacterial cotton fabric by incorporating a linear polysiloxane-based coating

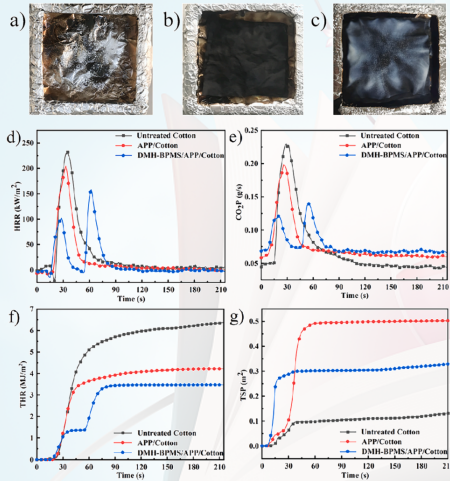
Xin Jin, Chaohong Dong\*

College of Textile and Clothing, Institute of Functional Textiles and Advanced Materials, State Key Laboratory of Bio-fibers and Eco-textiles, Qingdao University, Qingdao 266071, China, dongzh11.@163.com

### Preparation of DMH-BPMS and treated cotton fabrics



### burning behavior test



### Test of antibacterial properties

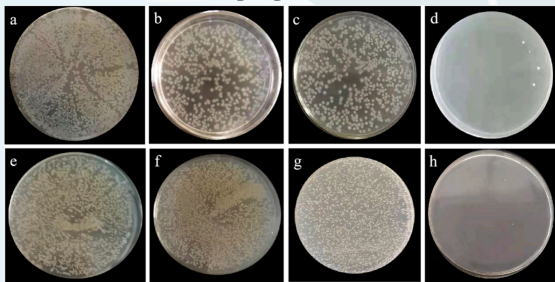


Fig. 9. Antibacterial pictures of fabrics: E. coli: a). Blank sample, b). cotton, c). APP/Cotton and d). DMH-BPMS/APP/Cotton. S. aureus: e). Blank sample, d). cotton, f). APP/Cotton and g). DMH-BPMS/APP/Cotton.

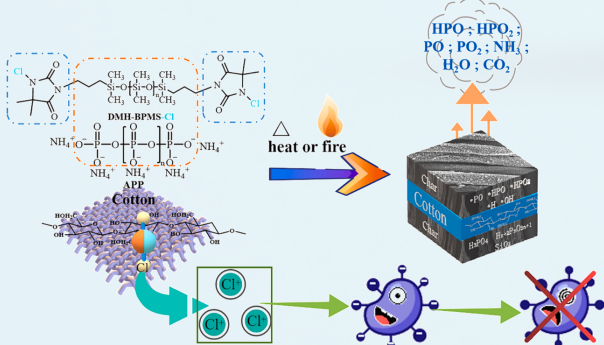


Fig. 10. Inferred flame retardant/antibacterial mechanism.

### Thermal stability, washing fastness and breaking strength test

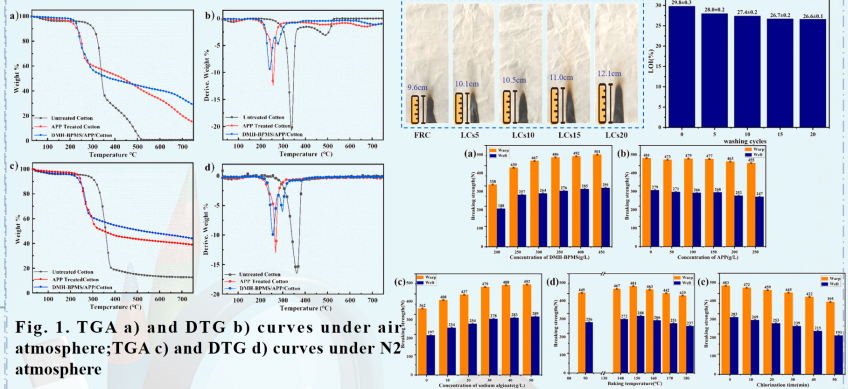


Fig. 1. TGA a) and DTG b) curves under air atmosphere; TGA c) and DTG d) curves under N<sub>2</sub> atmosphere

Fig. 2. Flame retardant performance of DMH-BPMS/APP/Cotton after 0, 5, 10, 15 and 20 water washing cycles. Fig. 3. Effect of flame retardant and antibacterial treatment on fabric mechanical strength (a). Concentration of DMH-BPMS, (b). Concentration of APP, (c). Con\_x0002\_centration of sodium alginate, (d). Baking temperature, e). Chlorination time.

### SEM and elemental analysis test

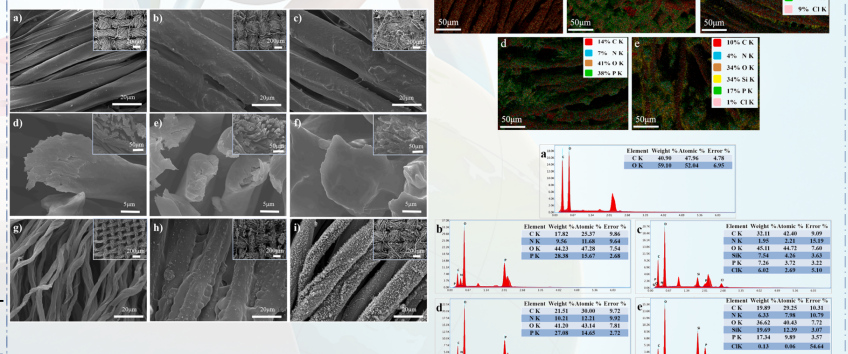


Fig. 5. SEM images of fabrics and their char residual: a). cotton, b). APP/Cotton, c). DMH-BPMS/APP/Cotton, d). cross section of cotton, e). cross section of APP/Cotton, f). cross section of DMH-BPMS/APP/Cotton h). APP/Cotton char residual and i). DMH-BPMS/APP/Cotton char residual.

Fig. 6. EDS images of fabrics and their char residual: a). cotton, b). APP/Cotton, c). DMH-BPMS/APP/Cotton d). APP/Cotton char residual and e). DMH-BPMS/APP/Cotton char residual.

### Carbon residue test

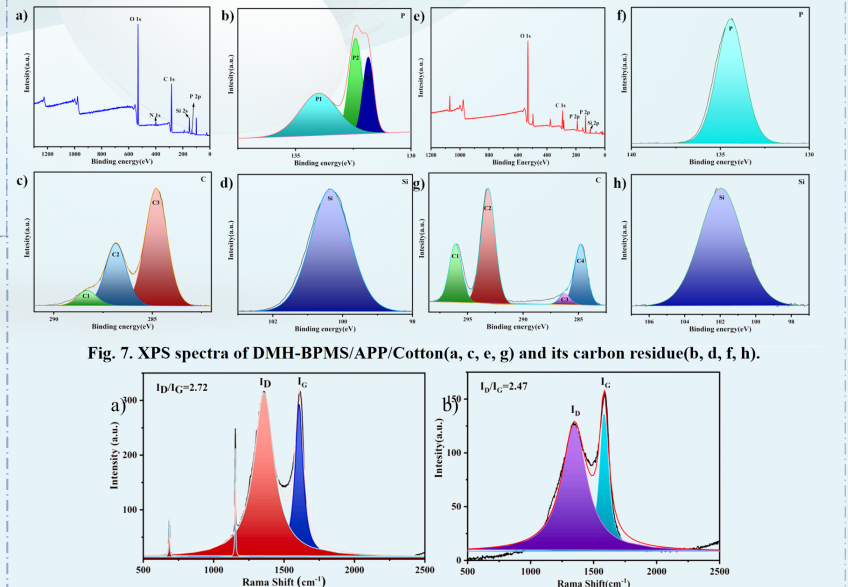


Fig. 7. XPS spectra of DMH-BPMS/APP/Cotton(a, c, e, g) and its carbon residue(b, d, f, h).

Fig. 8. 800 °C raman spectra of the exterior char residue a) APP/Cotton and b) DMH-BPMS/APP/Cotton.