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Topic of the Speech:
In-situ Crosslinking Reinforced Cellulose Aerogel Fibers for Thermal Insulation and Multifunctional Applications

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Professor Ronghui Guo is a professor of College of Biomass Science and Engineering at Sichuan University. She is candidate for academic and technical leaders of Sichuan Province, and overseas talents of Sichuan University. She obtained PhD from Hong Kong Polytechnic University. She is a member of the steering committee on textile and clothing of the Ministry of Education, member of the council for dyeing and finishing of the Chinese Society of textile engineering, director of the council of Sichuan textile engineering society and member of technical expert committee of energy conservation and environmental protection industry of Sichuan energy conservation association.

She mostly focuses on researches of functional and smart fiber materials, flexible wearable sensor, textile printing and dyeing wastewater treatment, high-value utilization of waste textiles, biomass fiber materials, fiber energy materials and devices, etc. In recent years, her researches have been supported by National Natural Science Foundation of China, Sichuan Science and Technology Program, Chengdu Science and Technology Bureau, Ningbo Science and Technology Bureau, the University of Hong Kong, the Hong Kong textile and garment research and development center, etc.

She has over 150 scientific publications including over 100 SCI papers in scientific journals such as Chemical Engineering Journal, Journal of Colloid and Interface Science, Carbon, ACS Sustainable Chemistry & Engineering, Journal of Power Sources and Journal of Hazardous Materials. One paper has become highly cited paper. She has owned more than 10 invention patents. Her research has been recognized by Ningbo Science and Technology Award and the Silver Award at the Geneva Invention Expo. She has been awarded as the excellent teacher by the China Textile Industry Federation.

ABSTRACT SUBMISSION
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In-situ Crosslinking Reinforced Cellulose Aerogel Fibers for Thermal Insulation and Multifunctional Applications

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ABSTRACT (NO MORE THAN 500 WORDS:)

Cellulose aerogel fibers (CAFs) which have a porous nanonetwork and fiber geometry are promising candidates for thermal insulation or flexible devices due to their excellent thermophysical properties, renewability and cost-effectiveness. However, their weak skeletal structure, low mechanical strength, combustibility and poor moisture resistance remain significant barriers to their commercial viability. The establishment of physical and chemical crosslinks is a potential strategy to enhance the strength, toughness, and overall performance of aerogels. In this work, interconnected networks of cellulose-based aerogel fibers are fabricated through continuous coagulation spinning and modified with the addition of 4,4'-methylene diphenyl diisocyanate (MDI) as the crosslinker. The CAFs modified with 1.5 wt% of MDI have good tensile strength (27.7 MPa), an ultrahigh Young's modulus (735 MPa), and excellent bending resistance even after they are knotted or looped for the tensile tests. The resultant fabric made with CAFs is lightweight and porous, with nearly the same thermal insulation properties of cotton wadding, yet only 1/5 of its thickness. In addition, different functionalized aerogel fibers have been fabricated, such as those that are colored, antibacterial and flame-retardant. The study shows the huge potential of cellulose-based aerogel fibers and textiles in producing the next generation of biomass-based high-performance thermal insulating devices.