A New Antimicrobial Cotton Textile with Cu Ions in Nanofibers

2023-01-14

A research team developed a new antimicrobial cotton textiles with Cu ions incorporated into the cotton structure at the molecular level (Cu-textile), which utilize the strong coordination bonding between Cu ions and the cellulose molecules and shows antiviral, antibacterial, wearable, and washable properties.

Cotton textiles are ubiquitous in daily life, and they are also one of the primary mediums for transmitting viruses and bacteria. Conventional approaches to fabricating antiviral and antibacterial textiles generally load the functional additives onto the surface of the fabric and/or their microfibers. However, such modifications are susceptible to deterioration after long-term use due to leaching of the additives.

Recently, a transdisciplinary and multi-institutional research team led by Liangbing Hu, Herbert Rabin Distinguished Professor of Materials Science and Engineering (MSE) at the University of Maryland (UMD) and director of the Center for Materials Innovation (CMI), and William Bentley, Fischell Distinguished Chair in Engineering and director of UMD's Robert E. Fischell Institute for Biomedical Devices, and Robert M. Briber, Professor of Materials Science and Engineering and Associate Dean for Research, developed a new antimicrobial cotton textiles with Cu ions incorporated into the cotton structure at the molecular level (Cu-textile), which utilize the strong coordination bonding between Cu ions and the cellulose molecules and shows antiviral, antibacterial, wearable, and washable properties. This study was published in Nature Nanotechnology on December 30, 2022.

The Cu-textile displays high antiviral and antibacterial performance against the Tobacco mosaic virus (TMV) and Influenza A virus (IAV), as well as E. coli, S. typhimurium, P. aeruginosa, and B. subtilis bacteria. This multi-institutional study also included research teams from National Institute of Standards and Technology (NIST), Purdue University, and Argonne National Laboratory.

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