



Topic of the Speech:

Innovative Anti-Bed Bug Bug Technology for Textiles and Clothing

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Dr. Kai-chiu Ho obtained Master of Arts degree, with distinction, in Clothing Merchandising in 2001 and the Doctor of Philosophy in 2005 from The Hong Kong Polytechnic University (PolyU). He has more than 45 years' work experience in Hong Kong's manufacturing industry, including textiles and clothing (T&C) on innovation and technology, R & D strategy, project design, management, and commercialization, etc. He is a Chartered Textile Technologist and a Fellow Member of the Textile Institute in UK (C.TEXT, FTI); a Senior Member of China Textile Engineering Society (SMCTES); an Advisory Board Member of the Fashion Gallery, The PolyU; an Adjunct Professor of Institute of Textiles and Clothing of PolyU (2013-2019), Honorary Associate Professor of the Faculty of Dentistry at the University of Hong Kong; Visiting Professor at both Donghua University, Zhejiang Sci-Tech University, Soochow University in China as well as a Honorary Consultant of the Hong Kong General Chamber of Textiles, Hong Kong Federation of Invention and Innovation, etc.

He worked in the Hong Kong Research Institute of Textiles and Apparel as the Director (Research and Development) from 2006 to 2016. His duties included formulating future technological development strategy and establishing R & D programmes to support project applications from local research institutions to resolve practical issues faced by the Hong Kong T&C industry. He works closely with government officials, brands, entrepreneurs, technology providers, academic and research institutions in China and Overseas to initiate new R & D projects conducive to T&C industry. His great efforts have caused HKRITA to act as the focal point of technological innovation. Successful technologies developed by research teams are "Nu-Torque yarn spinning", "Sweating Mannequin", "High Performance Clothing", "Hand Touch Tester", "Plasma Textile Treatment", "Supercritical Fluid Dyeing System", "Degradable Polyester", "T&C Sustainability", "Shape Memory Textiles", etc. of which some have obtained awards from the International Exhibition of Inventions of Geneva.

In July 2016, He joined Hansk New Material Holdings Limited (Hansk) as the R&D Director. Hansk is an international company leading in innovative multi-functional textile additives and building material technologies for public health protection including anti-insect, anti-microbial, anti-virus products, etc. He assists the top management to formulate future technological roadmap and lead a R&D team comprising two post-doc fellows to develop innovative and green pesticides, graphene-based mosquito repellents, new materials for textiles and clothing, etc. With the support of Hansk, He have successfully applied the "the 14th Shaoxing 330 Overseas Elites Scheme" in November 2016 by which a "Zhejiang-Hong Kong Innovative Fashion Research Institute" has been set up in Kejiao District, Shaoxing City of China to enhance fashion design and related advanced technologies. He was the CEO of the aforesaid Institute and the Distinguished Professor of Zhijiang College of Zhejiang University of Technology from Nov., 2016 to Oct., 2019, Senior Expert of "Overseas Elites Plan" of the Shaoxing City, the Chairman of PolyU Textiles & Clothing Alumni Association (China Headquarter), etc. He is the top expert/advisor in technological development and management, industrial economic and policy, advanced T&C design and technologies, R & D project design, management and commercialization, R&D operational management, supply chain's sustainability, etc.

ABSTRACT SUBMISSION

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ABSTRACT (NO MORE THAN 500 WORDS:)

Bed bugs, in early October 2023, had created serious public health problems appeared in France and the United Kingdom. This situation spread to South Korea, Japan, Taiwan, etc. Recently, it gradually attracts the attention of people in the world and they have expressed their concerns about bed bugs after the outbreak of COVID-19.

Bed bugs are parasitic arthropods who are macropredators that feed on blood, usually at night. Their bites can result in several health impacts including skin rashes, psychological effects, and allergic symptoms. Bed bug bites may lead to skin changes ranging from small areas of redness to prominent blisters. Symptoms may take between minutes to days to appear and itchiness is generally present. Some individuals may feel tired or have a fever. Typically, uncovered areas of the body are affected. Their bites are not known to transmit any infectious disease. Complications may rarely include areas of dead skin or vasculitis.

People's bedding, including sheets, mattress covers, mattresses, duvets, quilts, pillows, etc., are all made of textile materials. Generally, the structure of textile materials such as non-woven, knitted, and woven fabrics has many small pores and gaps, which makes it easy for bed bugs to hide.

Bed bugs become a common problem. They infest in residences, hotels, restaurants, kindergartens, schools, elderly homes, sea and land transportation systems, and other places where people move around. Many people associate bed bugs with unsanitary conditions, much like pests such as cockroaches and mosquitoes. However, bed bug infestations occur in a variety of social and economic settings. Experts speculate that the increase is more likely due to a combination of factors, such as increased travel and tourism, which increases the widespread spread of bed bugs around the world.

Synthetic anti-bed bug consists of organic esters (i.e., Permethrin); amines (i.e., DEET); carbamates (i.e., Icaridin); esters & amides (i.e., IR3535), etc. Amongst these synthetic insect repellents, Permethrin is found to be more suitable ones applied to textiles and clothing in terms of odorless; durability; functionality, toxicity, etc. People are inspired by the natural chrysanthemum's repellent ingredients to develop permethrin. Permethrin can attack the nervous system of bed bug, and makes it knock down and dead.

Our innovative formulation of Permethrin-based anti-bed bug technology can be applied to our textiles and clothing industrial sectors including synthetic fibre spinning; supercritical fluid carbon dioxide dyeing and finishing system, digital inkjet pigment printing for textiles fabric and garment, etc. These applications can facilitate ESG business by which they are cleaner production saving energy, water consumption, chemical utilization, air and effluent treatment, etc.