



Respiratory masks for infectious disease control and healthcare

Jinlian HU

City University of Hong Kong, Hong Kong.

Abstract:

Respiratory masks are the real frontline defence for medical workers and public during the time of this COVID-19 outbreak. It plays a major role to prevent and lessen the chance of disease transmission from person to person in the form of aerosols or droplets [3]. Respiratory protective masks are usually used when uncontrollable airborne contaminants from gases, dusts, vapours, dusts, particulate and aerosols. These types of masks are usually used by professionals working in hospitals, industry, agriculture, mines, emergency responders, military, and household personnel. Respiratory masks help to protect the users based on physical or occasionally by chemical filtration mechanisms. The nature of barrier properties may interfere with human physiological performances which can even lead to severe life-threatening conditions. Current pandemic situation has spurred the demand of respiratory masks to new heights. As a result, a variety of unqualified or novel non-standard and claimed functional mask types appeared in market to meet the sudden demand. These masks can be commonly categorized as consumer masks as most of them fail to meet the professional standards for medical and occupational use. Most of these are not ameliorated to provide a perfect balance of protection and physiological comfort to the user (Fig. 1A). Most respiratory masks are simple in its appearance and designed to fit different type of users. However, being simple they can interfere with breathing, thermal balance, tactile sensations, eyesight, communication, psychological feelings, eating, sneezing and other equipment attached to body [4,5]. Existing literature only provides scattered/fragmented studies on facemasks performance of some old styles, but innovation needs knowledge and science in all sectors of the supply chain from materials, textile structure, performance and human physiology and ergonomics. On the other hand, even though current innovative masks offer wide range of novel properties, their ability to satisfy most essential requirements at acceptable levels remains unsolved. We are going to present the key issues for Respiratory masks for infectious disease control and healthcare and possible solutions



Biography:

Professor Jinlian Hu, from the City University of Hong Kong, received education in Textile Engineering and Materials with PhD from Manchester University, MEng, Donghua University and BEng, Wuhan Textile University. She is a pioneer, sustained and distinguished academic leader with world-wide impact in shape memory polymers for various applications including biomaterials, medical and healthcare and textiles. Recently she has established the laboratory of Wearable Materials for Healthcare in City University of Hong Kong. This lab focuses on unearthing scientific principles and providing solutions to key problems in Healthcare of Wearable Materials in four major areas: Traditional Chinese medical therapies and their materials, energy materials and healthcare, personal protective materials as well as spider silks and their relatives as biomaterials. From the discoveries and models of basic research, applied investigation, product developments and standardization are envisaged, which can produce societal as well economic impact in addition to scientific advances.

Recent Publications:

1. A Spider|Capture|Silk|Like Fiber with Extremely High|Volume Directional Water Collection, Advanced Functional Materials, 2020.
2. Tea-polyphenol treated skin collagen owns coalesced adaptive-hydration, tensile strength and shape-memory property, International Journal of Biological Macromolecules Volume 158, 1 September 2020, Pages 1-8, 2020

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