

Photosensitizers integrated melt spun yarns for low energy light sterilization of medical hygiene textiles

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Abstract: The aim of sterilizing is to eliminate all viable microorganisms, including bacteria, viruses, fungi, and spores, as well as potentially non-cellular biological agents, from a surface, object, or substance. As of now, there is no textile sterilization method that effectively fulfills the criteria for textile integrity, thorough sterilization, user safety in relation to employed reagents, and low energy consumption simultaneously.

In cooperation with the SMUs DIENES Apparatebau GmbH and Jungmichel Textil GmbH as part of a joint project novel functionalized yarns and textiles have been developed to produce reusable medical textiles such as surgical drapes, protective clothing and hygiene textiles outside the operating theatre.

These items should have the capability to undergo sterilization through the use of visible or infrared light,

known for being gentle and energy-efficient. The produced yarns composed of functionalized PET and PP, activated by visible light to produce reactive oxygen, thereby eradicating microorganisms on the textile surface. Unlike high-energy UV light, which results in significant thread damage, the employed light operates within the visible wavelength range of the electromagnetic spectrum. Presented is the novel continuous melt spinning process as well as the the characterization of the sterilization capability.

Keywords: Photosensitizers, Antimicrobial fibers, Melt-Spinning, Medical Textiles

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