

Development of Multifunctional Yarns and Fabrics for Interactive Textiles

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Abstract : The use of conductive materials in smart and interactive textiles is gaining significant importance for creating value addition, innovation, and functional product development. These products find their potential applications in health monitoring, military, protection, communication, sensing, monitoring, actuation, fashion, and lifestyles. The materials which are most commonly employed in such type of interactive textile include intrinsically conducting polymers, conductive inks, and metallic coating on textile fabrics and inherently conducting metallic fibre yarns. In this study, silver coated polyester filament yarn is explored for the development of multifunctional interactive gloves. The composite yarn was developed by covering the silver coated polyester filament around the polyester spun yarn using hollow spindle technique. The electrical and tensile properties of the yarn were studied. This novel yarn was used to manufacture a smart glove to explore the antibacterial, functional, and interactive properties of the yarn. The change in electrical resistance due to finger movement at different bending positions and antimicrobial properties were studied. This glove was also found useful as an interactive tool to operate the commonly used touch screen devices due to its conductive nature. The yarn can also be used to develop the sensing elements like stretch, strain, and piezoresistive sensors. Such sensor can be effectively used in medical and sports textile for performance monitoring, vital signs monitoring and development of antibacterial textile for healthcare and hygiene.

Keywords : conductive yarn, interactive textiles, piezoresistive sensors, smart gloves

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