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Opinion

Research Proposal

Ikra Iftekhar Shuvo*

Department of Biosystems Engineering, Canada

Opinion

Electronic textiles or e-textiles being a relatively young domain can get a fast versatility and commercial usability, once the barriers to intra and intersectoral research approaches can be overcome to obtain a synergetic research result [1]. Atwa et al. [2] have done a notable research work for making the cotton and polyester yarn electro-conductive by coating the yarns with a silver nano-wires (Ag NWs) polymer solution.

However, a research matrix can be developed to optimize the results performed by Atwa et al. [2] by introducing a chemical carrier agent for increasing the permeability of the polyester yarn for increased penetration of Ag NWs inside the fibre interior while annealing at a 150 °C in a closed bath [3]. Addition of a chemical wetting agent with this carrier agent may also increase the Ag NWs uptake % leading to increased electro-conductivity. For increased flexibility of cotton, an enzymatic treatment on cotton prior annealing with Ag NWs can be conducted, which will lead to the increased hydrophilicity of the cotton [1,4]. Such property of increased flexibility can be harnessed where the application of flexibility is needed to undergo repeated bending for purpose of using clothing integrated sensors. Padding before annealing may also increase the Ag NWs uptake% of the yarns due to applied compressive load improving the evenness of surface.

Designing the electronic textiles with different textile construction methods, such as plain weave, twill, satin, etc., for weaving and interlock, rib, etc., for knitting may give a new dimension for integrating the sensors or actuators in the finished end product of e-textiles alongside with expected electrical conductivity or resistance. Such construction methods can be explored to further the research work of Atwa et al. [2]. for a better compatibility between electronic components and textile components while fabricating e-textiles. In addition to that, if the Ag NWs can be applied during the production of fibre reinforced nano-composites in conjunction with carbon nano-tubes (CNTs) by direct fibre wet spinning method or during the production of nonwoven fabric (i.e., neither knitted nor woven), then an electro-conductive substrate i.e., e-nonwoven can be manufactured from direct e-fibres by getting rid of the intermediary yarn manufacturing process, which will reduce a substantial amount of production cost, fabric preparatory time, and would diversify the application arena of e-textiles [5,6]. These are the primary research arenas, which can be explored to further the current research work of Atwa et al. [2].

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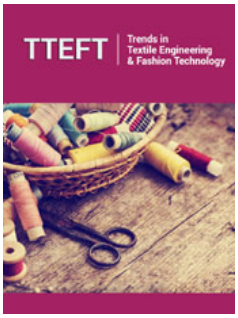

***Corresponding author:** Ikra Iftekhar Shuvo, Department of Biosystems Engineering

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