Experimental Investigations on Polyaniline Coated Textile Materials for Sensor and Electrode Applications.

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At present, wearable sensors in textile garments and accessories are mainly represented by embedded conventional electronic devices, such as conducting metal wires, electronic sensors, integrated circuits, LEDs and batteries. The textile material does not in itself take part or constitute any functionality but is merely a substrate or vehicle. This approach leads to several problems, where lack of comfort, durability and user friendliness is perhaps the most severe. So there is a need to develop textile itself perform interms of sensor functionality and wearability. Textile-based sensors have been developed using numerous different technologies, of which conductive coating and embedding of conductive yarns into knitted and woven structures are the most attractive to researchers. Some studies relating to the development of textile based sensors using polypyrole coating have been published. But literature suggests that among the various classes of conductive polymers, polyaniline is low cost and ease to synthesis and also has good environmental stability. In this work, textile based piezo-resistive strain and pressure sensors and electrodes for EEG measurement have been developed by conductive polymer coating over textile substrate. Polyaniline is used as a conductive polymer and the nylon lycra fabric was used as textile substrate for strain sensor application and polyurethane foam was used as textile substrate for pressure sensor and electrode applications. EMI shielding efficiency of polyaniline coated cotton, polyester and nylon fabrics are also studied.