Wearable Heart Rate Monitoring with Inkjet-Printed Graphene

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Abstract – 199 words

Inkjet-printing of graphene can be utilised in wearable applications, as its conductive properties allow the creation of highly flexible electronic tracks on e-textiles. Printed e-textiles have been previously demonstrated using metals such as silver and aluminium, but these are expensive and their nanoparticle formulation causes environmental concerns with their disposal. Inkjet-printing of graphene may overcome these issues, but it is challenging due to the difficulties of creating continuous conductive paths on porous textile substrates. In this work we demonstrate inkjet-printed graphene on a cotton substrate which provides wearable heart rate monitoring that can be integrated into clothing. We have compared the performance of the printed graphene to a standard commercial heart rate device that uses photoplethysmography (PPG). After testing on 4 healthy participants, we have been able to monitor heart rate to within 2.1 bpm, and to a mean SNR of over 21 dB. This textile material can be used in the next generation of wearables, creating fully flexible devices that are embedded into clothes and have the potential to be truly unobtrusive. These devices can be used for personal health monitoring, allowing users to have a continuous recording of their heart activity taken by just wearing the clothing.