ABSTRACT SUBMISSION

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π - π Stacking on Fibre Functionalization and Application in Wearable Device

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ABSTRACT (NO MORE THAN 500 WORDS:)

Fibre surface modification is important in functional fabrics development and innovation. Traditional chemical bonding and crosslink technologies will damage the fine fibre structures and affect their intrinsic properties. π-π Stacking refers to attractive, noncovalent interactions between aromatic rings, since they contain pi bonds, which can be good approach in fibre surface modification. Our group employed Polydopamine, Tannic acid, and other polyphenols to modify various fibres, providing a perfect platform for catalyst absorbing and subsequent electroless deposition (ELD). By understanding the nucleation, growth, and structure of electroless metal deposits, the surface morphology of metal nanoparticles can be controlled in nanoscale with simple variation of the plating time. When the electroless plating time is 20 min, the normalized resistance (R/R0) of as - made conductive fibers is only 1.6, which is much lower than a 60 min ELD sample at the same conditions (R/R0 ≈ 5). This is because a large number of unfilled gaps between nanoparticles prevent metal films from cracking under bending. Importantly, the Kelvin problem is relevant to deposited conductive coatings because metallic cells have a honeycomb - like structure, which is a rationale to explain the relationships of conductivity and flexibility. This π-π Stacking also was introduced as an interfacial layers for fibre reinforced composites.