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Continuous Dyeing of Graphene and Polyaniline on Textiles for Electromagnetic Interference Shielding: An Application of Intelligent Fabrics

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Abstract : This study explores the use of intelligent textiles for electromagnetic shielding through the continuous dyeing of graphene and polyaniline onto cotton fabric. Graphene was obtained by recycling graphite from spent batteries, and polyaniline was obtained in situ using H2O2. Graphene and polyaniline were bottom-modified on the fiber surface to improve adhesion and achieve a uniform distribution. This study evaluated the effect of the specific gravity percentage on sheet performance and active shielding against electromagnetic interference (EMI). Results showed that the dyed fabrics of graphene, polyaniline, and graphene/polyaniline demonstrated higher conductivity and EMI SE values of 9 to 16 dB in the 8 to 9 GHz range of the X-band, with potential applications in electromagnetic shielding. The use of intelligent textiles offers a sustainable and effective approach to achieving EMI shielding, with the added benefits of recycling waste materials and improving the properties of cotton fabrics.

Keywords : 'ntelligent textiles, graphene, polyaniline, electromagnetic shielding, conductivity, recycling.
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