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Original Research Article

Graphene Heating Film Preparation and Performance Evaluation

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ABSTRACT

To address the issues of poor graphene dispersion, uneven thermal conductivity, and the environmental effect of porous polyurethane (PU) solutions, natural nano cellulose is employed as a surfactant to dissolve the graphene slurry in order to build a composite heating film. By altering the volume of the graphene slurry, the screen-printing method performs in-situ coating on heat-reflective cloth (sportswear lining materials) and determines the heating impact and washing qualities of the clothing. The results reveal that natural nanocellulose has a good dispersion effect. After the addition of silver paste, graphene dispersions with varying concentrations exhibit good thermal and electrical conductivity. When the heating voltage is 8v and the graphene slurry concentration is 12.5 % (wwt), the surface temperature of the heating film can exceed 50°C while the power consumption is low, which not only maintains long-term power supply but also addresses the shortcomings of the traditional polyester heating film, such as uncomfortable wearing. Furthermore, even after washing and soaking it more than 50 times, it has an excellent heating function.

Keywords: Nano cellulose; Graphene; Thermal conductivity; Dispersion effect.