Thermo-responsive PNIPAm-based Composite Nanofibers Prepared by Electrospinning

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Flexible and wearable electronics capable of detecting the temperature, the motion and the stress in the body have been developing recently. Such devices rely heavily on the stimuli-responsive materials. Particularly, flexible materials which can give electrical response to the change of temperature are crucial for wearable healthcare electronics, and thus have received great research interests recently. Herein, a thermo-responsive copolymer was prepared by copolymerization between N-isopropylacrylamide (NIPAm) and N-methylol acrylamide (NMA). AgNO₃ was mixed with the P(NIPAm-co-NMA) solution to fabricate nanofibers by electrospinning, which was then converted into Ag by in-situ reduction with sodium borohydride. The electrical resistance of the composite nanofiber showed high sensitivity to the change of temperature. Furthermore, the composite nanofibers exhibited excellent stability during repeated heating-cooling cycles.

Keywords: Thermo-responsive material; nanofiber; in-situ reduction; copolymerization

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