

Stretchable conductor based on SWCNT/nylon textile

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Stretchable electronic devices have drawn much attention due to their light weight, flexibility, and portability. Fabrication of stretchable electronic devices based on textile have been considered as promising approach to realization of the devices. Nylon textile is widely used for garment and has many functions such as excellent elasticity and durability. In this context, nylon textile is an ideal substrate for manufacturing stretchable and conductive textiles. Stretchable and conductive textiles are fabricated by integration of textiles and conductive materials. Among conductive materials, single walled carbon nanotubes (SWCNTs) are promising candidates due to their excellent electrical conductivity and flexibility.

In this study, we fabricated highly stretchable and conductive textiles by using nylon textile and SWCNTs. The oxidized SWCNTs were attached to surface of silanized nylon fibers. Chemical oxidation of SWCNTs and silanization of nylon textile were carried out using oxidant such as H_2SO_4/HNO_3 and silane coupling agent. The oxidized SWCNTs can create covalent bond with silanized nylon fibers, resulting in strong adhesion between SWCNTs and nylon fibers. This SWCNT/nylon textile can sustain up to 100 % strain without electric failure.