Thermo-Mechanical Twisting and Training Conditions of Twisted-Coiled PET Fiber Actuators

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Thermal activated actuator based on twisted polymeric fibers has opened new paradigm toward the development of effective devices that can be easily manufactured using high-strength and inexpensive materials such as sewing thread or fishing line. The anisotropic of thermal expansion of polymeric fibers can be thermally activated by twisting until coils form. Twisted-coiled PET fiber exhibited the maximum linear actuation up to 9% by external heating at around glass transition temperature of PET fiber (ca. 160 – 180℃). We present the result of thermo-mechanical features of an actuator at different conditions of preload, training load, and payload each applied for twisting, heat training, and tensile actuating, respectively. Also, we deposited the graphene oxide on the PET fiber surface to evaluate the actuation capabilities of this new fibrous system.