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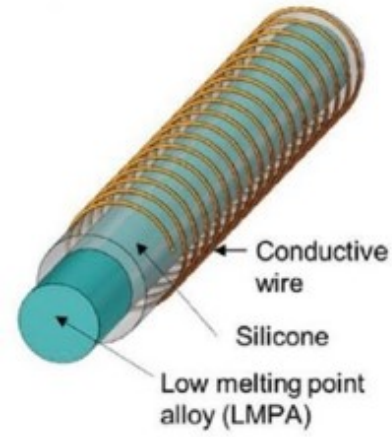
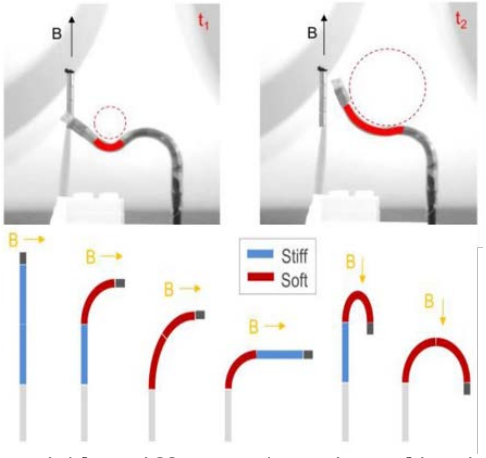
Licensing Opportunity

TTO – Technology Transfer Office

Variable Stiffness Fiber with Self-Healing Capability



Fiber structure



Variable stiffness endoscopic application

Finger cast prototype application

Ref. Nr

6.1575

Keywords

morphing systems, LMPA, variable stiffness, catheter, fabric

Intellectual Property

US 1,0113,537 B(2)

Publications

https://infoscience.epfl.ch/record/222718?ln=fr

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12/06/2019

Description

Soft hardware technologies are increasingly used in devices intended for tasks requiring high dexterity or conformability such as manipulation, locomotion, rehabilitation and surgical operations. However, material compliance can become a limiting factor for situations that require exertion or withstanding of substantial forces such as weight support, load carriage or high contact forces.

Advantages

A variable stiffness fiber made of silicone and low melting point alloys that quickly becomes >700 times softer and >400 times more deformable when heated above a threshold temperature. The fibre has a metal core, consisting of low melting point alloys (LMPA), which is contained within a pre-stretched silicone tube. At room temperatures the LMPA is a solid, thus, the fibre is stiff; when an electrical current is passed through a copper wire coiled around the tube, the LMPA inner core is warmed above a threshold temperature and melts, thus, the fibre becomes soft and deformable.

Applications

- Reconfigurable endoscopic tools
- Variable stiffness wearable devices (i.e. casts for bone injuries)
- Soft actuators