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第 1 条, 共 1 条

标题: Bioinspired fiber-regulated composite with tunable permanent shape and shape memory properties via 3d magnetic printing
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来源出版物: COMPOSITES PART B-ENGINEERING **卷:** 164 **页:** 458-466 **DOI:** 10.1016/j.compositesb.2019.01.061 **出版年:** MAY 1 2019

Web of Science **核心合集**中的 "被引频次": 11

被引频次合计: 12

使用次数 (最近 180 天): 16

使用次数 (2013 年至今): 135

引用的参考文献数: 47

摘要: Shape memory polymers (SMPs) generally change shape from a temporary state to a permanent state, and the permanent shape is only determined by its initial form, which leads to the lack of design freedom for SMPs. In order to enrich morphing behavior and extend applications of SMPs, bioinspired design and fabrication methods need to be developed. Many biological dynamic materials enable shape changes ranging from bending, twisting to spiraling using site-specific aligned cellulose microfibrils orientations. Here, we proposed an approach integrating bioinspired fiber architectures and varying 3D printing parameters into SMPs, to achieve tunable permanent shape and shape memory properties. The self-folded flower and sequentially deployed smart robotic hand have been developed to demonstrate the feasibility of our method. The proposed bioinspired SMPs, which is rarely seen in the previous reports, have intriguing fundamental properties and hold great potential for applications in soft actuators, smart textiles, wearable equipment, medical devices, and other intelligent apparatus.

入藏号: WOS:000463297300045

语言: English

文献类型: Article

作者关键词: 3D printing; Bioinspired; Fiber-regulated shape memory composite; Tunable permanent shape; Tunable shape memory properties

KeyWords Plus: POLYMER NANOCOMPOSITES; PERFORMANCE; RECOVERY; BEHAVIOR

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出版商: ELSEVIER SCI LTD

出版商地址: THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, OXON, ENGLAND

Web of Science 类别: Engineering, Multidisciplinary; Materials Science, Composites

研究方向: Engineering; Materials Science

IDS 号: HR6XU

ISSN: 1359-8368

eISSN: 1879-1069

29 字符的来源出版物名称缩写: COMPOS PART B-ENG

ISO 来源出版物缩写: Compos. Pt. B-Eng.

来源出版物页码计数: 9

基金资助致谢:

基金资助机构	授权号
National Key R&D Program of China	2018YFB1105100
Key Scientific and Technological Project of Jilin Province	20170204061GX

This research was supported by National Key R&D Program of China (2018YFB1105100) and the Key Scientific and Technological Project of Jilin Province (No. 20170204061GX).

输出日期: 2021-03-22

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