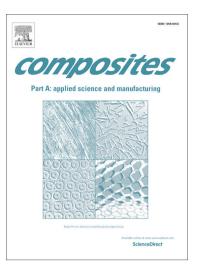
Accepted Manuscript

Magnetoactive elastomer/PVDF composite film based magnetically controllable actuator with real-time deformation feedback property

Jiabin Feng, Shouhu Xuan, Li Ding, Xinglong Gong

PII: DOI: Reference:	S1359-835X(17)30335-4 http://dx.doi.org/10.1016/j.compositesa.2017.09.004 JCOMA 4773
To appear in:	Composites: Part A
Received Date: Revised Date: Accepted Date:	31 May 20174 September 20175 September 2017



Please cite this article as: Feng, J., Xuan, S., Ding, L., Gong, X., Magnetoactive elastomer/PVDF composite film based magnetically controllable actuator with real-time deformation feedback property, *Composites: Part A* (2017), doi: http://dx.doi.org/10.1016/j.compositesa.2017.09.004

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Magnetoactive elastomer/PVDF composite film based magnetically controllable actuator with real-time deformation feedback property

Jiabin Feng^a, Shouhu Xuan^{ab,*}, Li Ding^a, Xinglong Gong^{a,*}

^a CAS Key Laboratory of Mechanical Behavior and Design of Materials, Department of Modern Mechanics, University of Science and Technology of China, Hefei, 230027, People's Republic of China

^b National Synchrotron Radiation Laboratory, University of Science and Technology of China, Hefei, 230027, People's Republic of China

* Corresponding author: Email: xuansh@ustc.edu.cn (S. Xuan), gongxl@ustc.edu.cn (X. Gong)

Abstract

This work reported a high performance flexible magnetically controllable actuator based on magnetoactive elastomer (MAE) and poly (vinylidene fluoride) (PVDF) composite film. The magnetic-mechanic-electric coupling properties of the actuator were systematically investigated by cyclical wrinkle, magnetic bending, and stretching test. The induced charge under a magnetic bending can reach as large as 158 pC even at small magnetic field of 100 mT with the bending angle up to almost 90 degrees within 0.6 s. Moreover, a new model was proposed to theoretically reveal the intrinsic correspondence. The model matches well with the experimental results. Based on this kind of actuator, a magnetically controllable tentacle is developed, which could grasp, transport, and release object by switching the supplied current. Due to the real-time deformation feedback characteristics, this kind of actuators can find wide applications in actively controllable engineering, artificial robotics, and biomedicine.

Keywords: A. Polymer-matrix composites (PMCs), A. Smart materials, B. Magnetic properties, B. Mechanical properties, Magnetoactive elastomer

1. Introduction

Intelligent soft active materials are of enticing prospect for the realization of specific

Download English Version:

https://daneshyari.com/en/article/7889973

Download Persian Version:

https://daneshyari.com/article/7889973

Daneshyari.com