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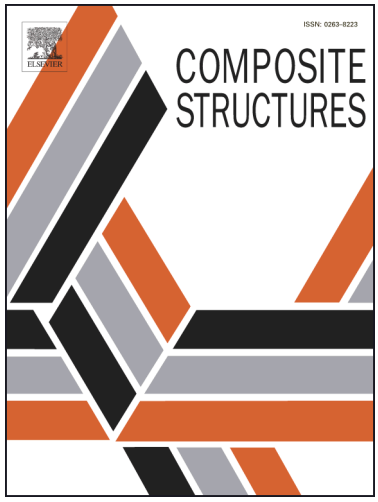

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Yongtao Yao, Yun Luo, Haibao Lu, Bing Wang

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ACCEPTED MANUSCRIPT

Remotely actuated porous composite membrane with shape memory property

Yongtao Yao, Yun Luo, Haibao Lu*, Bing Wang*

Science and Technology on Advanced Composites in Special Environments Laboratory, Harbin Institute of Technology, Harbin 150080, China.

*E-mail: luhb@hit.edu.cn and wangbing86@hit.edu.cn

Abstract

Shape memory polymers (SMPs) are a kinds of smart materials that have capability of memorizing and recovering to their original shape in response to external stimuli. Comparing with the block SMPs, electrospun SMP mats with porosity and low mechanical property are better suited for a certain application, especially in bio-medical filed, tissue engineering, drug delivery, catalysis, etc. In this study, nanofiller enhanced composite membrane were developed based on Fe nanowire and (ethylene-vinyl acetate copolymer) EVA. Electrospinning technique was selected to fabricate this composite SMP membrane. To optimize shape memory effect, the cross-linked network was achieved by varying the UV curing time and cross-linking agent content. Remotely actuation composite membrane was completed by a light-thermal stimuli, which was assisted by Fe nanowire via light energy converting to thermal energy. High shape recovery rate was obtained via hot water actuation.

Keywords: shape memory membrane, shape memory effect, composite membrane, electrospinning

1. Introduction

Shape memory polymer is a class of stimuli responsive polymers, which could convert from a temporary shape to their permanent shape via applying a suitable

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