## Accepted Manuscript

A flexible and transparent thin film heater based on a carbon fiber /heat-resistant cellulose composite

Pengbo Lu, Fan Cheng, Yanghao Ou, Meiyan Lin, Lingfeng Su, Size Chen, Xilang Yao, Detao Liu

PII: S0266-3538(17)31739-6

DOI: 10.1016/j.compscitech.2017.09.033

Reference: CSTE 6923

To appear in: Composites Science and Technology

Received Date: 18 July 2017

Revised Date: 5 September 2017

Accepted Date: 11 September 2017

Please cite this article as: Lu P, Cheng F, Ou Y, Lin M, Su L, Chen S, Yao X, Liu D, A flexible and transparent thin film heater based on a carbon fiber /heat-resistant cellulose composite, *Composites Science and Technology* (2017), doi: 10.1016/j.compscitech.2017.09.033.

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## ACCEPTED MANUSCRIPT

1	A Flexible and Transparent Thin Film Heater Based on a Carbon Fiber /Heat-resistant
2	Cellulose Composite
3	Pengbo Lu, Fan Cheng, Yanghao Ou, Meiyan Lin, Lingfeng Su, Size Chen, Xilang Yao, Detao
4	Liu*
5	State Key Laboratory of Pulp and Paper Engineering, South China University of Technology,
6	Guangzhou 510640, P. R. China
7	Abstract: The thin flexible film heater made of carbon fibers is widely considered to be an ideal
8	material for the use as self-heating devices because of its safe, low-cost, no noises, small size and
9	fast heating as well as energy saving. Presently thin flexible film heater is mostly fabricated by
10	mixing method using the long cellulose fibers as film-forming materials and carbon fibers as
11	self-heating materials, which mostly suffer from opaque or uneven heating field. In this work, we
12	firstly reported a flexible and transparent thin film heater (FTFH) composed of carbon fibers and
13	regenerated cellulose. The use of regenerated cellulose for membrane materials brings high
14	transmittance, strong adhesion, fast temperature response and high generated temperature. More
15	importantly, the FTFH using novel carbon fibers as self-heating materials and regenerated
16	cellulose as membrane materials show a rapid heating response (12 s), higher power density (2577
17	w/m <sup>2</sup> ) and long-term stability of generated temperature (162.3 $\Box$ ).
18	Keywords: Carbon fibers; Flexible composites; Mechanical properties; Thermal properties
19	
20	

## 21 **1. Introduction**

\*Corresponding author. Tel.: +86 182 0764 1980

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Email: <u>dtliu@scut.edu.cn(Dt.L)</u>

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