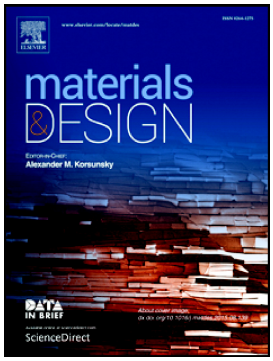

Fabrication of antibacterial electrospun nanofibers with vancomycin-carbon nanotube via ultrasonication assistance

Chunmei Liu, Hengchong Shi, Huawei Yang, Shunjie Yan, Shifang Luan, Yuchao Li, Mouyong Teng, Ather Farooq Khan, Jinghua Yin

PII: S0264-1275(17)30136-3
DOI: doi: 10.1016/j.matdes.2017.02.008
Reference: JMADE 2748

To appear in: *Materials & Design*

Received date: 16 December 2016
Revised date: 5 February 2017
Accepted date: 6 February 2017

Please cite this article as: Chunmei Liu, Hengchong Shi, Huawei Yang, Shunjie Yan, Shifang Luan, Yuchao Li, Mouyong Teng, Ather Farooq Khan, Jinghua Yin , Fabrication of antibacterial electrospun nanofibers with vancomycin-carbon nanotube via ultrasonication assistance. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Jmade(2017), doi: 10.1016/j.matdes.2017.02.008

Facile Fabrication of Antibacterial Electrospun Nanofibers with Vancomycin-Carbon Nanotube via Ultrasonication Assistance

Chunmei Liu [a], Hengchong Shi [b*], Huawei Yang [b], Shunjie Yan [b], Shifang Luan [b], Yuchao Li [a], Mouyong Teng [a*], Ather Farooq Khan[c], Jinghua Yin [b]

[a] *Department of Materials Science and Engineering, Liaocheng University, Liaocheng 252059, P. R. China*

[b] *State Key Laboratory of Polymer Physics and Chemistry, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun 130022, P. R. China*

[c] *Interdisciplinary Research Centre in Biomedical Materials, COMSATS Institute of Information Technology, Defence Road, Off. Raiwind Road, Lahore 54000, Pakistan*

Abstract: The aggregation of multi-walled carbon nanotubes (MWCNT) into the polymer matrix and weak bactericidal property of MWCNT usually limit the application of MWCNT in the infection resistance. To solve the above problem, vancomycin hydrochloride modified multi-walled carbon nanotube (Van-MWCNT) via the chemical reaction of the MWCNT's inherent carboxyl group and the Van's amide group were well designed and synthesized. Then, Van-MWCNT was facilely *in-situ* anchored onto thermoplastic polyurethane (TPU) electrospun nanofibers (TPU/Van-MWCNT) by ultrasonication assistance to achieve the bactericidal property. The above preparation process was facile, non-toxic with the green solvent-water as medium. At the same time, it also effectively reduced the aggregation of Van-MWCNT into the electrospun nanofibers. The minimal inhibitory concentration (MIC) of Van-MWCNT against *S. aureus* was obviously lower than that of MWCNT. And the TPU/Van-MWCNT exhibited excellent antibacterial properties evaluated

[*] Corresponding authors: Hengchong Shi (shihc@ciac.ac.cn); Mouyong Teng (tengmouyong@lcu.edu.cn)

Tel.: +86 431 85262109; Fax: +86 431 85262109