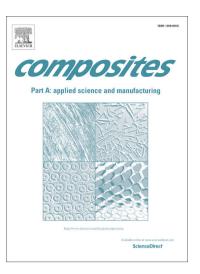
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Ultra-strong polyethyleneimine-graphene oxide nanocomposite film via synergistic interactions and its use for humidity sensing

Lei Chen^{a,b,d}, Zhi Li^{a,b}, Guangshun Wu^c, Yidi Wang^d, Tao Wang^{a,b}, Yan Ma^{a,b}, Bin Fei^{d,*}

a College of Textiles and Garments, Southwest University, Chongqing 400715, China b Chongqing Engineering Research Center of Biomaterial Fiber and Modern Textile, Chongqing 400715, China

c School of Chemistry and Materials Science, Ludong University, Yantai 264025, China

d Nanotechnology Centre, Institute of Textiles & Clothing, The Hong Kong Polytechnic University, Hong Kong, China

Abstract

The ternary roles of polyethyleneimine (PEI) as a polymer matirx, a reducing agent and a surface modifier have been presented to fabricate graphene oxide (GO) reinforced polymer nanocomposite films. GO is modified with PEI-glycerol diglycidyl ether (GDE) cross-linking networks in aqueous solution and *in situ* reduced by PEI simultaneously. Synergistic reinforcement of mechanical interlocking and hydrogen bonding leads to dramatic increases in tensile strength and Young's modulus by 98.3% and 87% respectively, at 7.5 wt% GO loading of PEI. The partial reduced GO sheets serve as moisture barriers for water-soluble PEI, and the nanocomposite films are shown to be structurally robust humidity sensors over the

^{*} Corresponding author. Tel: +852 2766 4795; Fax: +852 2773 1432. E-mail: tcfeib@polyu.edu.hk (B. Fei)

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