

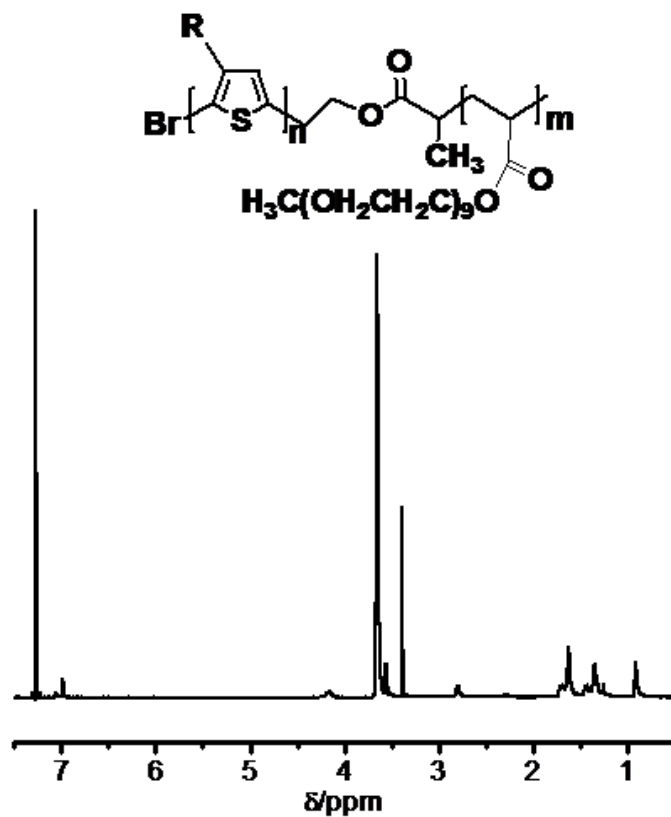
# Polymer-Derived Ceramic Composite Fibers with Aligned Pristine Multiwalled Carbon Nanotubes

*Sourangsu Sarkar, Jianhua Zou, Jianhua Liu, Chengying Xu, Linan An, Lei Zhai*

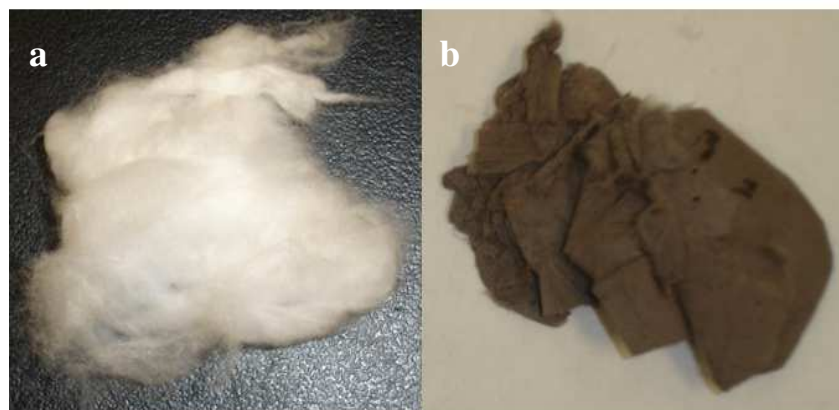
## Supporting Information

**1. Synthesis of Polyaluminasilazane.** 40.008 g Ceraset™ VL20 (purchased from Kion Corporation, Charlotte, NC) and Al sec-butoxide (purchased from Sigma-Aldrich, St Louis, MO) was reacted in a 100 mL conical flask at 125°C for 36 hours under argon (Ar) atmosphere with magnetic stirring. The mixture was cooled for overnight and a solid polymer was obtained.

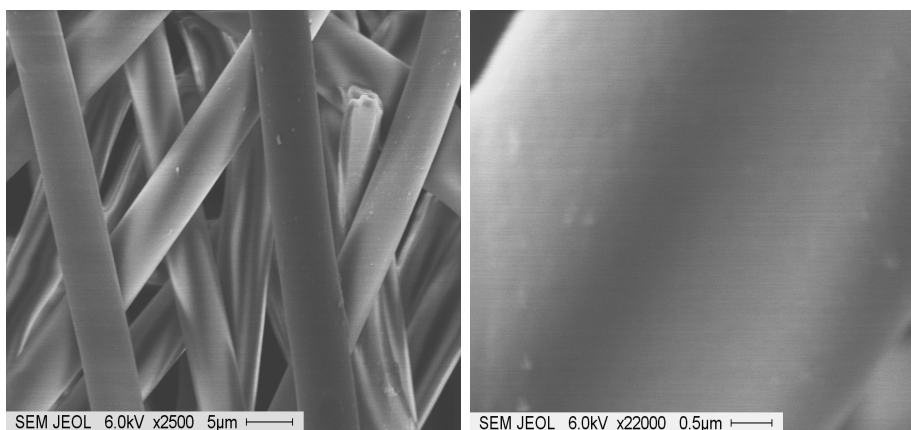
**2. Synthesis of the block copolymer poly(3-hexylthiophene)-*b*-poly (poly (ethylene glycol) methyl ether acrylate) (P3HT-*b*-PPEGA).** P3HT macroinitiator (180 mg, 0.028 mmol), CuBr (8.0 mg, 0.056 mmol), PMDETA (0.056 mmol) and PEGA (2.514 g, 5.537 mmol) were dissolved in 4 mL toluene. After degassed by three cycles of freeze-pump-thaw, the polymerization was carried out at 100°C for 20 hours. After getting rid of the copper by passing through a short column, the block copolymer was precipitated in cold diethyl ether for 3 times and then dried under vacuum at 60°C. The molecular weight ( $M_n$ ) of P3HT-PPEGA was determined by gel permeation chromatography (GPC) to be 16900 with a polydispersity index  $M_w/M_n$  of 1.5. The molar ratio of the 3-hexylthiophene unit to PEGA was determined to be 1: 2.8 by comparing the peaks of proton a and b as shown in Figure S3. <sup>1</sup>H NMR (CDCl<sub>3</sub>): 6.98 (s, 4 proton of thiophene), 4.17 (br s, CH-COO-CH<sub>2</sub>), 3.64 (t, -CH<sub>2</sub>-CH<sub>2</sub>-OCH<sub>3</sub>), 3.39 (s, -CH<sub>2</sub>-OCH<sub>3</sub>), 2.79 (t,  $\alpha$ -CH<sub>2</sub>).



**Figure S1.**  $^1\text{H}$  NMR Spectrum of P3HT-b-PPEGA block copolymer.



**Figure S2.** Nonwoven fiber mats of electrospun fibers of (a) pure polyaluminasilazane and (b) polyaluminasilazane/MWCNT (0.3 wt %).



**Figure S3.** SEM images of polyaluminasilazane fibers electrospun from 20 % polyaluminasilazane chloroform solutions.