Electronic Supplementary Information (ESI)

Flexible single-walled carbon nanotubes/polyaniline composite films and their enhanced thermoelectric properties

Jilei Liu,[a] Jing Sun*[a] and Lian Gao[a]

[a]*State Key Lab of High Performance Ceramics and Superfine Microstructure, Shanghai Institute of Ceramic, Chinese Academy of Sciences, Shanghai, 200050, China. E-mail: jingsun@mail.sic.ac.cn*

Experimental

Materials. Pristine SWNTs were synthesised by chemical vapour deposition at Chengdu Organic Institute, Chinese Academy of Sciences. The SWNTs were purified via the following process. First, 150mg of pristine SWNTs were refluxed in 2.6M nitric acid, at 140℃for 24h. The solution then was filtered and washed by deionized water and absolute ethanol. Finally, the acid-SWNTs were dried at 60℃ for 24h in a vacuum oven.

SWNT bucky paper was prepared in a typical process that has been reported in previous research[1-2].

Free-standing SWNT/PANi composite films were synthesized by a simple electrochemical method. In a three-electrode cell containing aqueous solution of 1M H_2SO_4+0.05M aniline, PANi was electrodeposited on the working electrode by potentiodynamic cycling between -0.2V and 0.75V (vs SCE) at a sweep rate of 20mV/s. Here, SWNT bucky paper was attached to a thin nickel wire and used as the

working electrode, while platinum wire and SCE were used as the counter and reference electrode, respectively.

Characterization. The electric conductivitywas measured by a four-point probe method in van der Pauw configuration with an Accent HL5500 System.The Seebeck coefficient was measured in van der Pauw configuration with an Accent HL5500 System too. The carrier mobility and carrier density measurements were performed in a Quantum Design Physics Property Measurements System (PPMS).

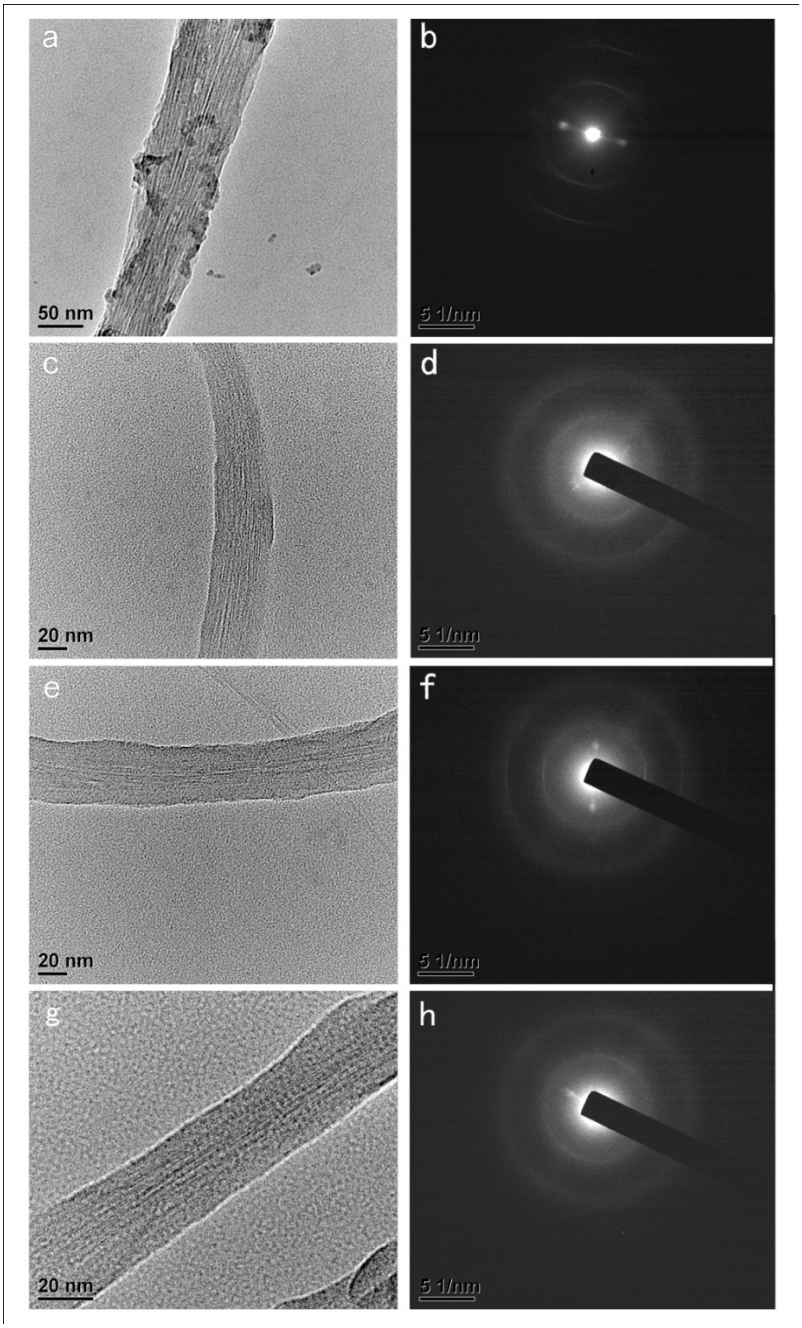

Fig. S1. TEM images and corresponding selected area electron diffraction (SAED) patterns for SWNT/PANi25 (a, b), SWNT/PANi50 (c, d),SWNT/PANi75 (e, f) andSWNT/PANi100 (g, h), respectively.

1 Gou J. H. *Polym. Int.*2006, 55, 1283-1288

2 R. Smajda, A. Kukovecz and Z. Konya.*Carbon*, 2007, 45, 1176-1184