Supporting information for

A multifunctional multi-walled carbon nanotubes/ceramic membrane composite filter for air purification

Yang Zhao,[a] Zhaoxiang Zhong,* Ze-xian Low,[b,a] Zhong Yao,[a]

[a]State Key Laboratory of Materials-Oriented Chemical Engineering, National Engineering Research Center for Special Separation Membrane, NanjingTech University, Nanjing 210009, China

[b]Centre for Advanced Separations Engineering and Membranes@Bath, Department of Chemical Engineering, University of Bath, Claverton Down, Bath BA2 7AY, United Kingdom

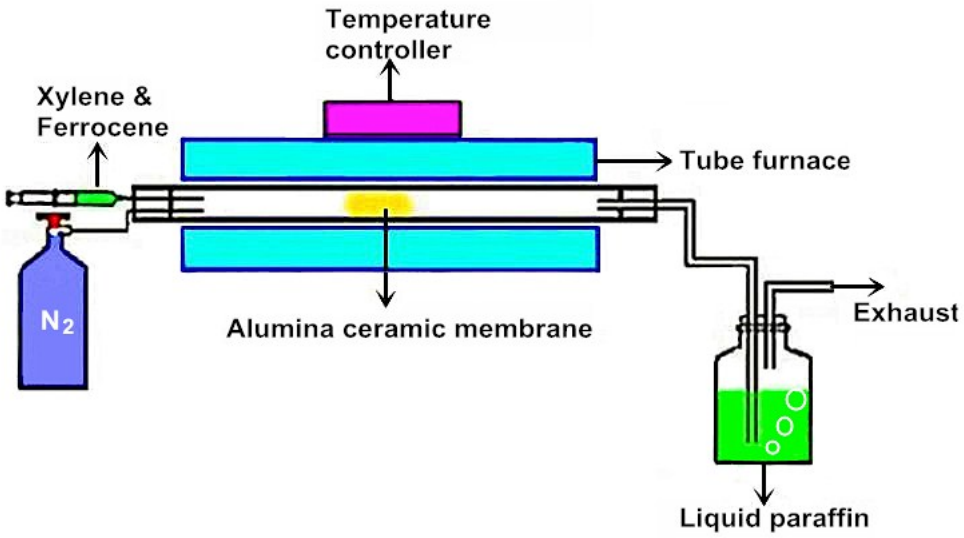

Fig. S1 An illustration of MWCNTs grown on the alumina ceramic membrane. N_2 was used as the carrier and protective gas. Xylene and ferrocene were used for carbon source and catalyst for MWCNTs growth. Liquid paraffin can remove the most xylene and ferrocene in the exhaust.

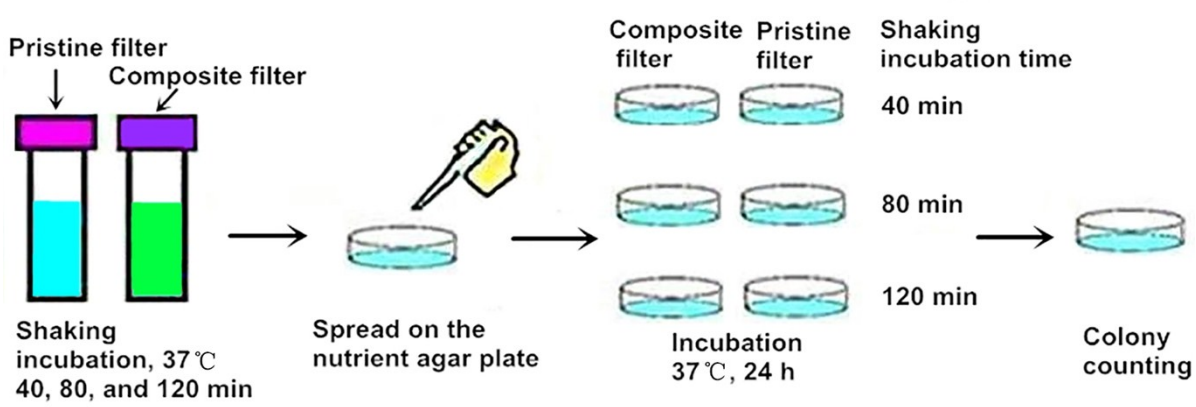

Fig. S2 An illustration of antibacterial experiment procedure. *Escherichia coli* (*E.coli*, ATCC 25922) was selected as the model bacteria to test the antibiotic property of the pristine filter and the composite filter.

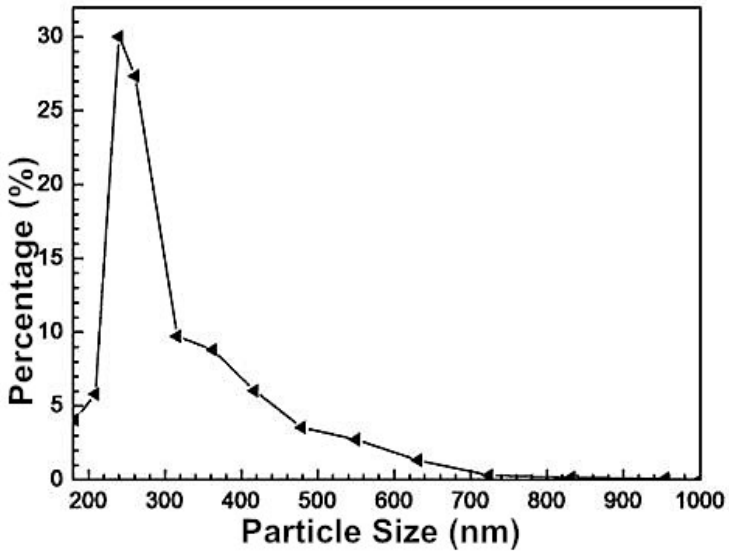

Fig. S3 Particles size distribution of SiO_2.

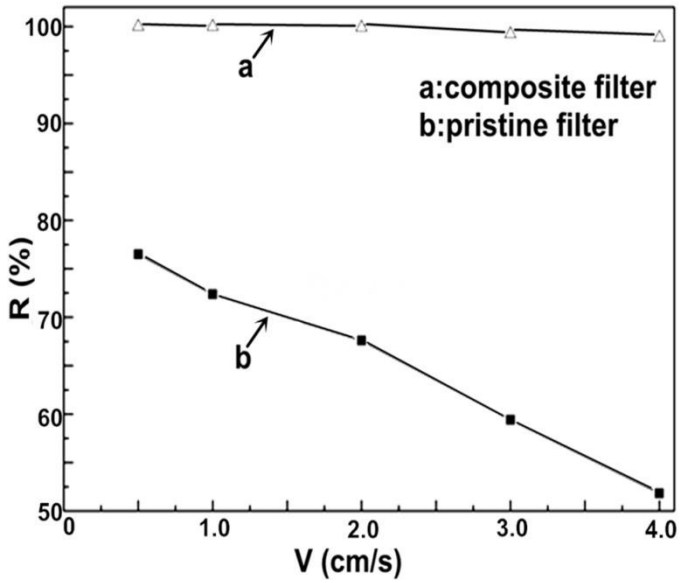

Fig. S4 The relationship between the gas velocity and retention rate of the filters. a represented the retention rate varying with gas velocity of the composite filter, while b was the retention rate varying with gas velocity of the pristine filter.

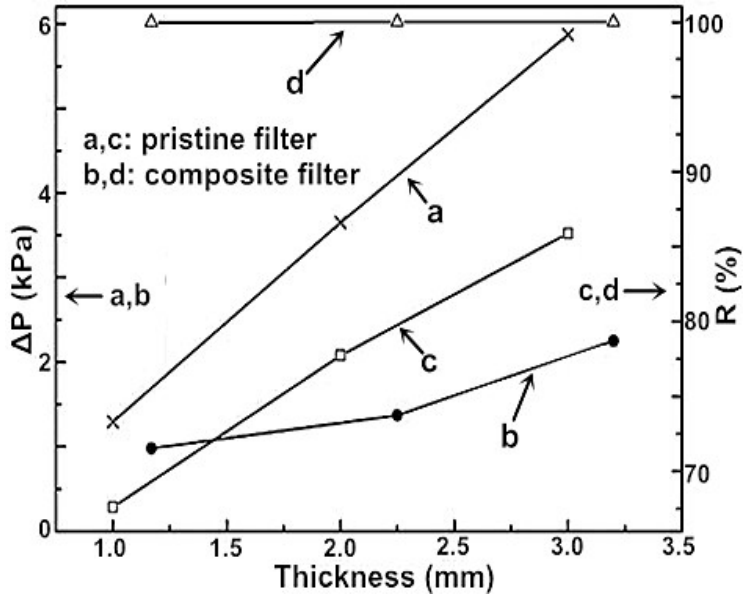

Fig.S5 Pressure drop and retention rate of the filters varying with the filter thickness. At the gas velocity of 2cm/s, a and b represented the pressure drop varying with the thickness of the pristine filter and the composite filter respectively, while c and d were the retention rate varying with filter thickness of the pristine filter and the composite filter respectively.

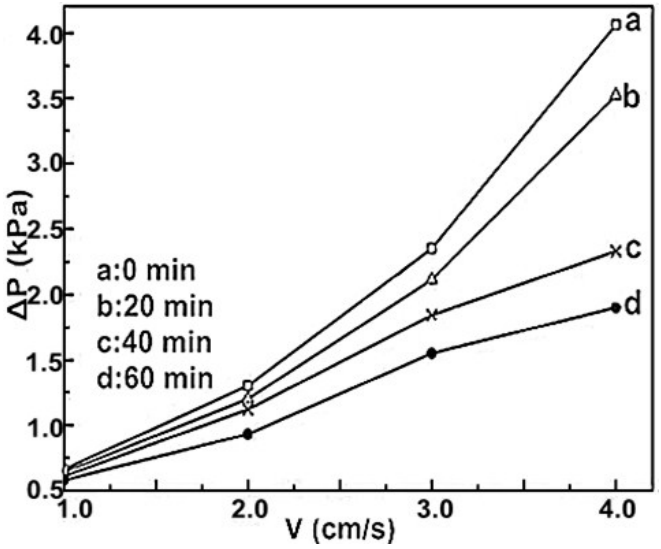

Fig. S6 Pressure drop varying with gas velocity for different preparation time of the composite filters. a represented the pristine filter (0 min), while b, c and d represented the composite filters with MWCNTs growth time of 20 min, 40 min and 60 min respectively.