Electronic Supplementary Material (ESI) for Environmental Science: Nano.

Multifunctional metal organic framework and carbon nanotube-modified filter for combined ultrafine dust capture and SO_2 dynamic adsorption

Shasha Feng,[a] Xingya Li,[b] Shuaifei Zhao,[c] Yaoxin Hu,[b] Zhaoxiang Zhong,*[,a]

Weihong Xing,*[,a] Huanting Wang[b]

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

[b] Department of Chemical Engineering, Monash University, Clayton, Victoria 3800, Australia.

[c] Department of Environmental Sciences, Macquarie University, Sydney, NSW 2109, Australia

SUPPORTING INFORMATION

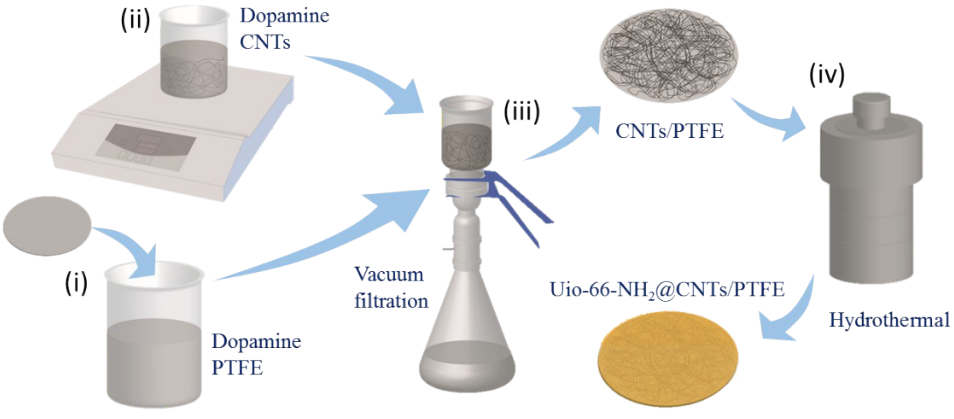

Figure S1. The schematic diagram of the experimental process.

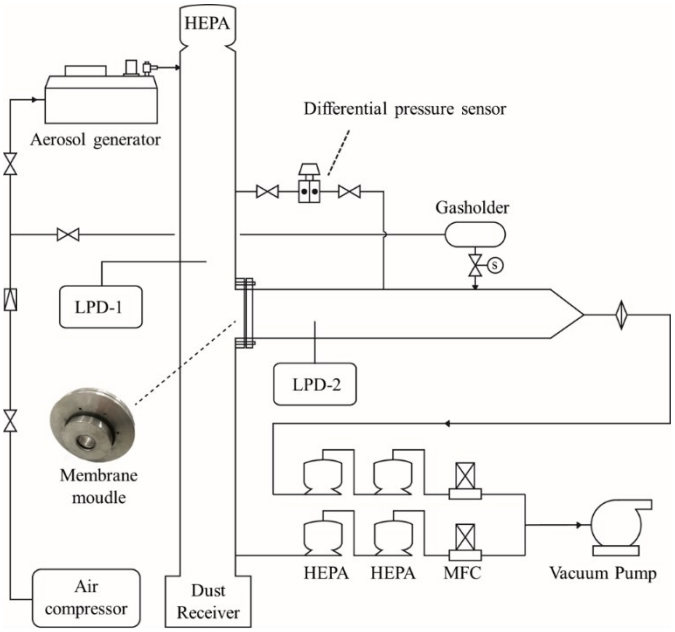

Figure S2. The schematic diagram of the dust filtration test apparatus.

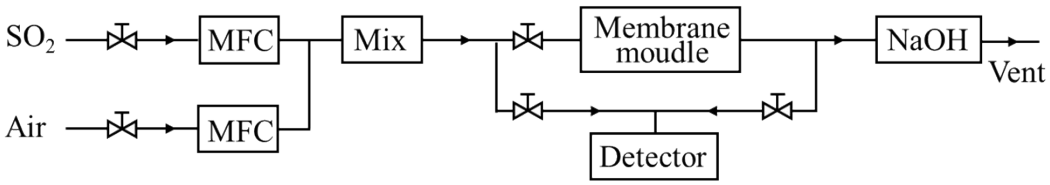

Figure S3. The schematic of the SO_2 dynamic adsorption tests.

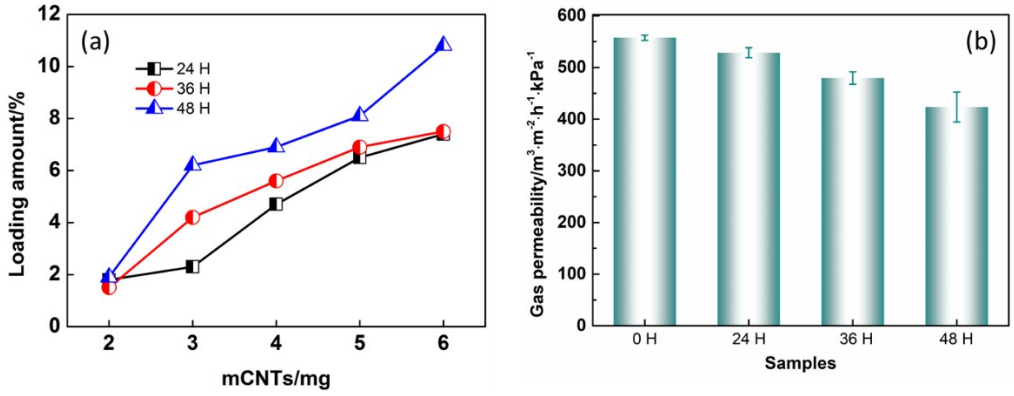

Figure S4.(a) Dopamine functionalized CNTs loading amount changes with the increase of CNTs dose, and three curves are dopamine modified PTFE membrane with 24, 36, and 48 h, respectively; (b) gas permeability of pDA modified PTFE membrane with different dopamine treatment time.

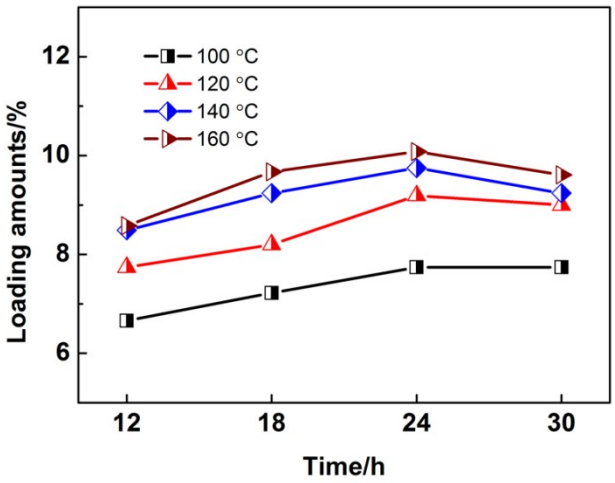

Figure S5. UiO-66-NH_2 loading amount with the changes of the reaction temperature and time.

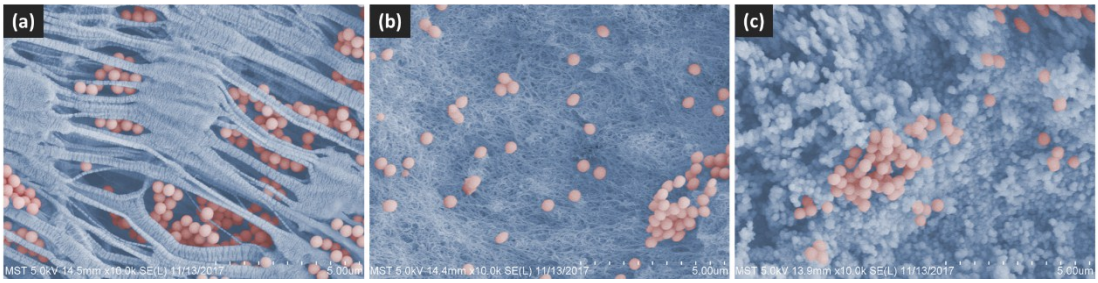

Figure S6. SEM images of different samples after filtrated with fine dust(nano-SiO_2). (a) pristine PTFE; (b) CNTs/PTFE; (c) UiO-66-NH_2@CNTs/PTFE.

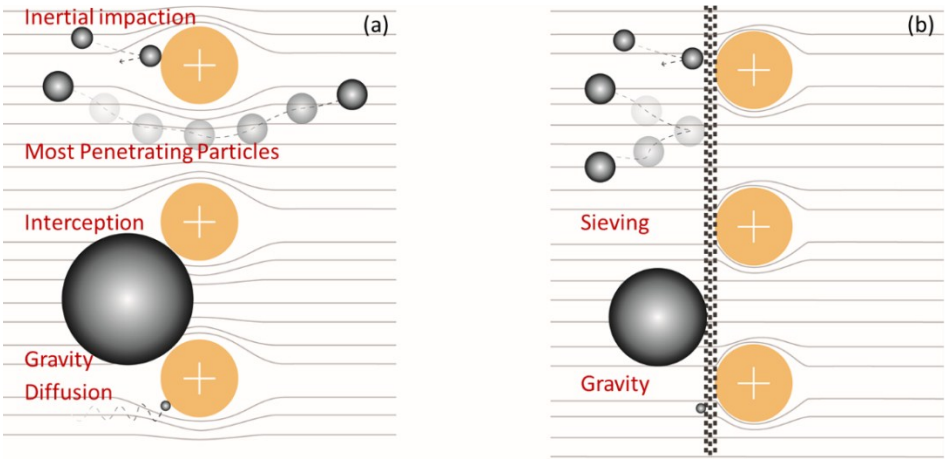

Figure S7. Filtration mechanism of (a)Pristine PTFE membrane and (b) UiO-66-NH_2@CNTs/PTFE.

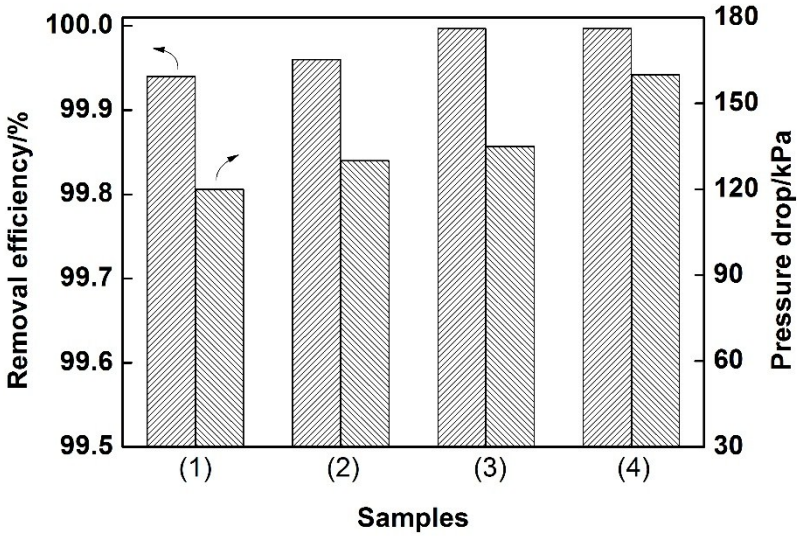

Figure S8. The dust removal efficiency and filtration pressure drop of (1) pristine PTFE, (2) pDA modified PTFE, (3) CNTs/PTFE (4) UiO-66-NH2@CNTs/PTFE, at the filtration conditions of gas velocity 2.0 m/min, inlet dust concentration was ~375 mg·m^{-3}, test area of 7.07 cm2 (φ=3 cm).

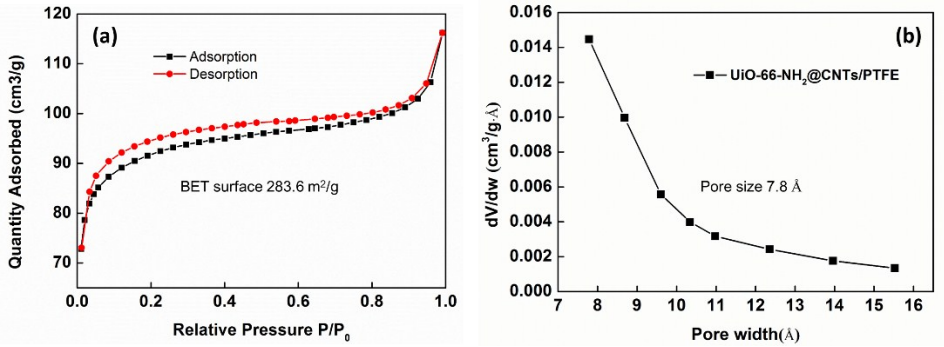

Figure S9. (a) N_2 sorption isotherms of UiO-66-NH_2@CNTs/PTFE; (b) BJH pore diameter distribution curve;