Supporting information

Table S1 Characteristics of the synthetic municipal wastewater used in this study.

Parameters	Concentration(mg/L)
COD	300~330
NH4+-N	32~62
TN	32~62
Phosphate	4.2~7.6

Table S2 Physical characteristics of Polyvinylidene fluoride (PVDF) hollow fiber membrane.

Type	60E0025SA
Area	25㎡/piece
Nominal bore（μm）	0.4
Inner diameter（mm）	1.2
Outside diameter（mm）	2.8
Size L×D×H（mm）	1250×30×2000

Table S3 Physical characteristics of carboxylated multi-walled carbon nanotubes.

Diameter	Purity	length	Specific surface area	EC	Bulk density
>50nm	>95%	<10μm	>40m2·g-1	>100s/cm	0.18g/cm3

Table S4 UV-visible analysis of percolation and backwashing of tap water by HF-PVDF-CNT membrane filtration over 120 mins

| Filtration (mins)	UV-Vis Absorbance (850nm)	MWCNTmass (mg)
10	0.004	0.00066
20	0.005	0.00075
30	0.004	0.00066
40	0.001	0.00033
50	0.006	0.00087
60	0.008	0.00108
70	0.01	0.00129
80	0.004	0.00066
90	0.016	0.00192
100	0.015	0.00183
110	0.014	0.00171
120	0.013	0.00162
Backwash		0.2007
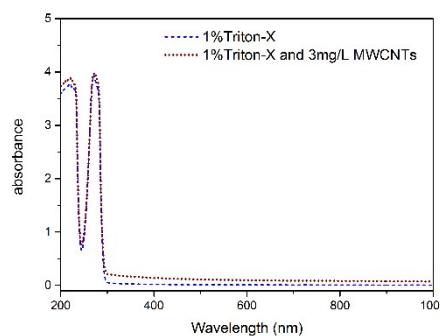
Fig. S1 Absorbance curves of Triton X-100 surfactant and MWCNTs at wavelengths from 200-900nm.
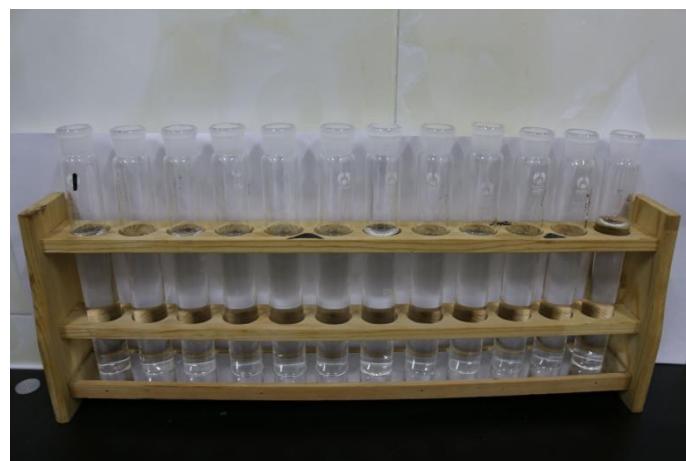
Fig. S2 Image showing all backwash water collected.
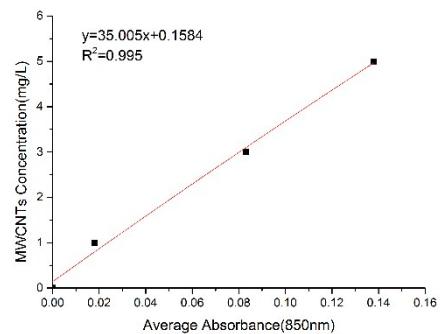
Fig. S3 Standard curve of MWCNT mass concentration based on the average absorbance at 850nm.
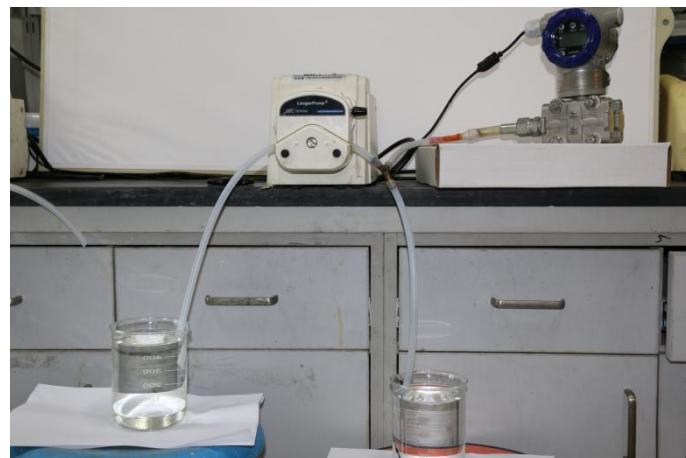
Fig. S4 Filtration procedure used for BSA, SA and HA solutions.

Fig. S5 Physical diagram of R1 (left) and R2 (right).