Supporting Information

Electrospun Silk Nanofiber Loaded with Ag-doped TiO_2 with High-reactive Facet as Multifunctional Air Filter

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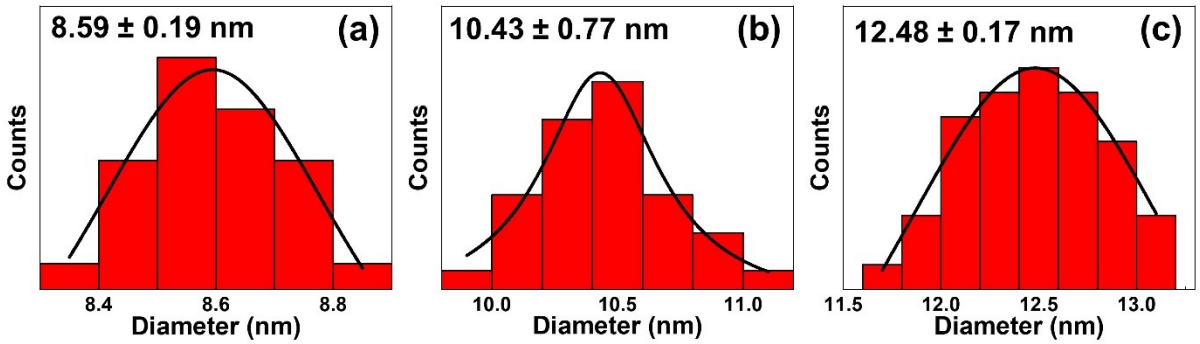

Fig. S1 Particle size distribution of AgNPs (a) 0.1%Ag-TiO_2, (b) 1%Ag-TiO_2, and (c) 10% Ag-TiO_2.

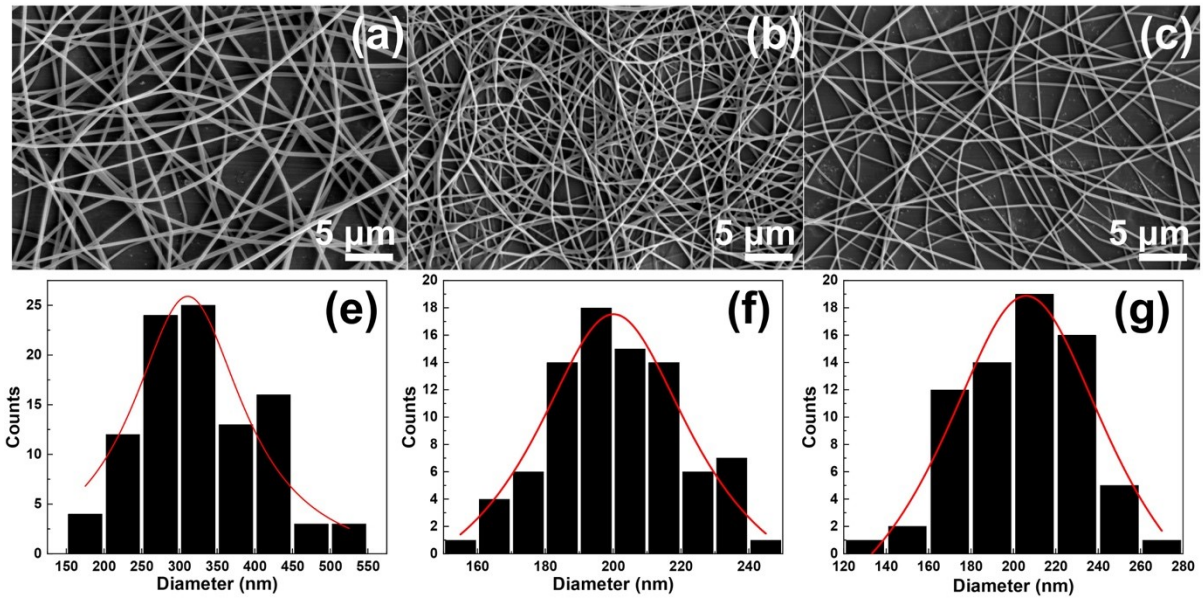

Fig. S2. SEM images of electrospun silk obtained from using applied voltage of (a) 12 kV, (b) 15 kV, and (c) 20 kV with injection flow rate of 0.6 mL/h.

Table S1 Summary of average fiber diameter and coefficient of variation of electrospun silk

Samples	**Applied voltage (kV)**	**Average fiber diameter (nm)**	**Coefficient of variation (SD/FD)**
Silk	12	311.05 ± 12.47	0.040
	15	200.14 ± 1.73	0.009
	20	206.02 ± 3.38	0.016

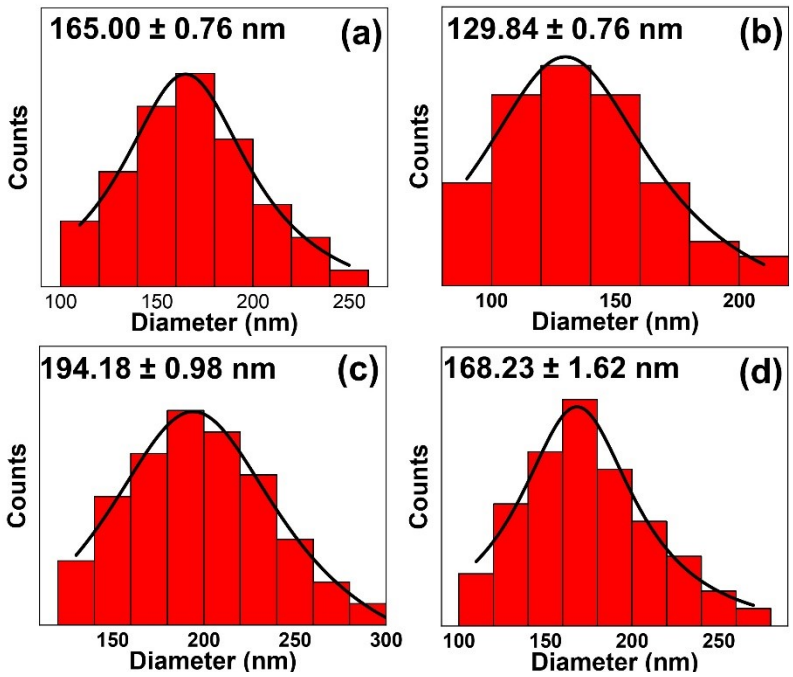

Fig. S3. Particle size distribution of fiber diameter (a) TiO_2 (001), (b) 0.1%Ag-TiO_2, (c) 1%Ag-TiO_2, and (d) 10%Ag-TiO_2.

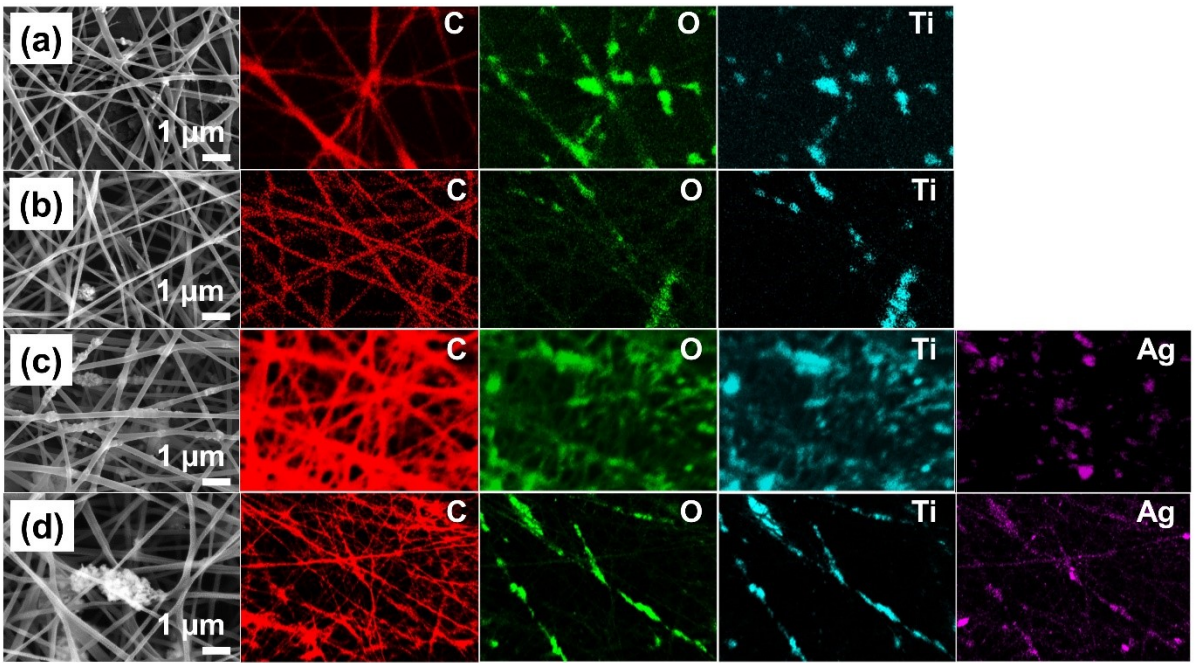

Fig. S4 SEM and EDS mapping images of (a) TiO_2-silk, (b) 0.1%Ag-TiO_2-silk, (c) 1%Ag-TiO_2-silk and (d) 10%Ag-TiO_2-silk.

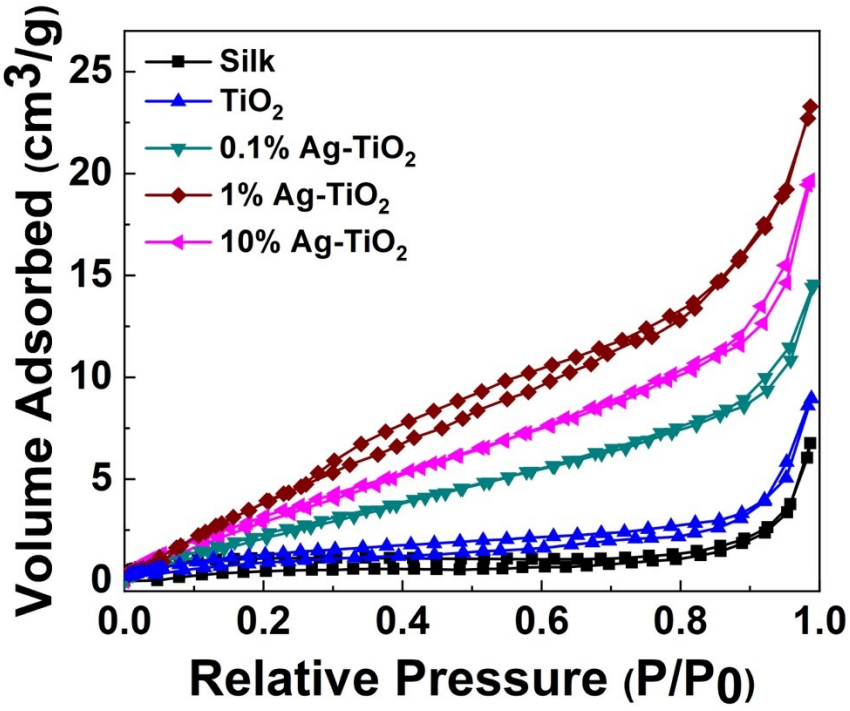

Fig. S5 BET adsorption isotherm of electrospun silk, TiO_2-silk, 0.1%Ag-TiO_2-silk, 1%Ag-TiO_2-silk, and 10%Ag-TiO_2-silk nanofibers.

Table S2. Summary of $PM_{2.5}$ filtration efficiency, pressure drop and quality factor of silk, TiO_2-silk and Ag-TiO_2-silk nanofibers

Samples	Filtration Efficiency (%)	Pressure drop (Pa)	Quality factor (Pa^{-1})
Silk	77.59 ± 0.58	30.00 ± 3.61	0.050 ± 0.005
TiO_2-silk	87.03 ± 1.10	31.67 ± 3.79	0.064 ± 0.007
0.1%Ag-TiO_2-silk	89.92 ± 1.29	33.67 ± 2.31	0.068 ± 0.008
1%Ag-TiO_2-silk	99.04 ± 1.70	34.33 ± 1.15	0.135 ± 0.017
10%Ag-TiO_2-silk	92.53 ± 2.10	35.67 ± 5.51	0.073 ± 0.023

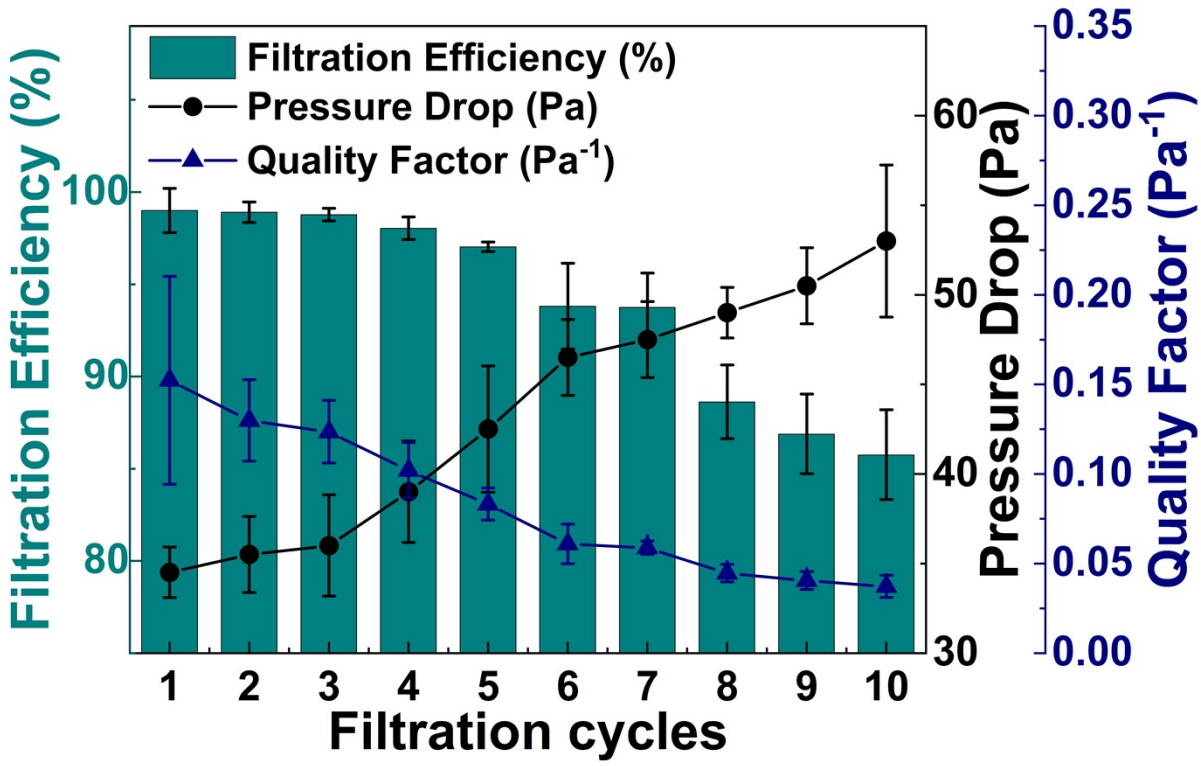

Fig. S6 $PM_{2.5}$ removal performance of 1%Ag-TiO_2 nanofiber from one to ten cycles.

Table S3. The apparent reaction rate constants (k) of photodegradation of formaldehyde

Catalysts	**Formaldehyde (k, min^{-1})**
Control Exp.	4.70×10^{-5}
TiO_2	0.07
0.1%Ag-TiO_2-silk	0.001
1%Ag-TiO_2-silk	0.034
10%Ag-TiO_2-silk	0.017