

Preparation of Ag Doped Keratin/PA6 Nanofiber Membrane with Enhanced Air Filtration and Antimicrobial Properties

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Comparison of coarse wool and commercial wool

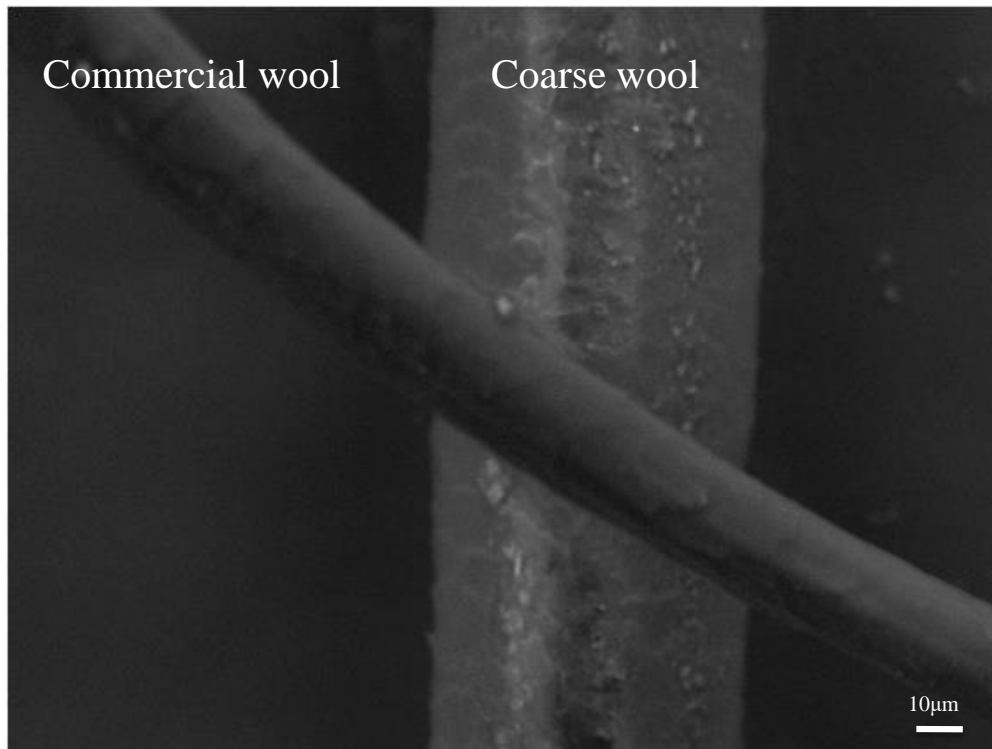


Figure S1. SEM images of coarse wool and commercial wool

SDS-PAGE

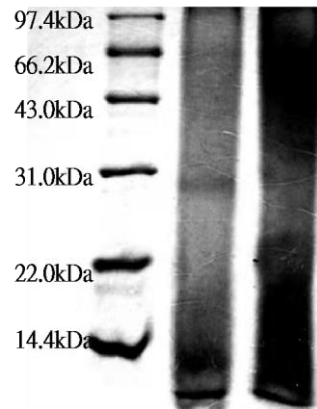


Figure S2. Schematic diagram of SDS-PAGE gel electrophoresis. The left is the low weight standard protein (marker), the middle is the method of $\text{Na}_2\text{S}_2\text{O}_3$ keratin electrophoresis image and the right is the method of NaHSO_3 keratin electrophoresis image.

Pore size distribution of the composite membrane

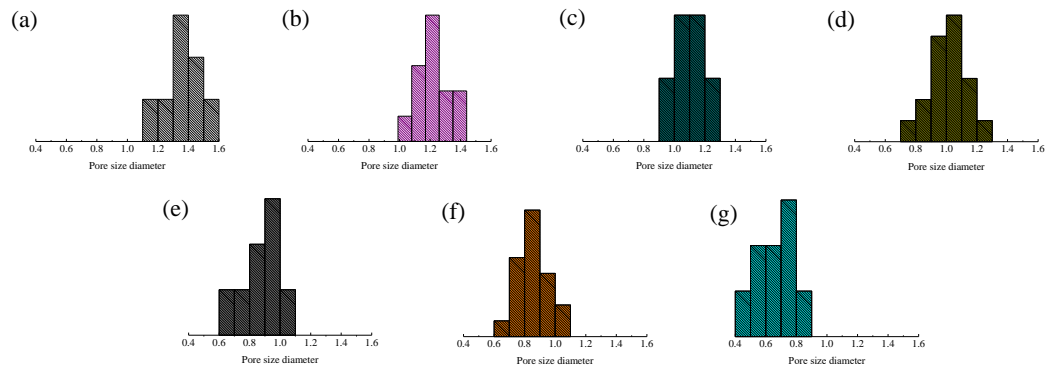


Figure S3. Schematic diagram of pore size distribution of composite membrane, The a, b, c, d, e f and g column images of Ker.0%/PA6, Ker.30%/PA6, Ker.30%/PA6 Ag.1%-Ker.30%/PA6, Ag.10%-Ker.30%/PA6, Ker.50%/PA6 and Ker.70%/PA6, respectively.

Filter efficiency and pressure drop

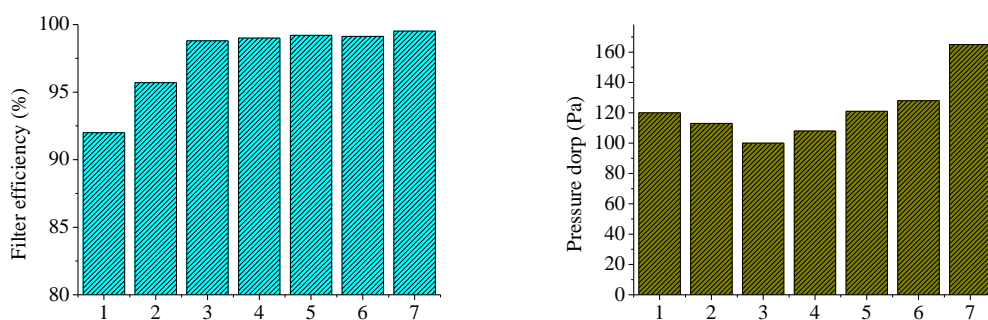


Figure S4. Schematic diagram of filter efficiency and pressure drop. The 1, 2, 3, 4, 5, 6 and 7 column images of Ker.0%/PA, Ker.30%/PA6', Ker.30%/PA6, Ag.1%-Ker.30%/PA6, Ag.10%-Ker.30%/PA6, Ker.50%/PA6 and Ker.70%/PA6, respectively.

Table S1. Pore size diameter, WVT, and QF of nano-structure mats.

Samples	Pore size diameter (μm)	WVT (g/m ²)	QF
Pure PA6	1.398 \pm 0.2	151.2	0.021
Ker.30%/PA6'	1.240 \pm 0.3	155.6	0.028
Ker.30%/PA6	1.113 \pm 0.2	166.2	0.044
Ag.1%-ker.30%/PA6	1.005 \pm 0.2	163.3	0.042
Ag.10%-ker.30%/PA6	0.8784 \pm 0.2	157.8	0.04
Ker.50%/PA6	0.8487 \pm 0.2	154.4	0.037
Ker.70%/PA6	0.6330 \pm 0.2	146.2	0.032

Thermal stability

Table S2. Mass of residues, peak degradation temperatures and melting temperatures of the different nanofibers mats.

Samples	Mass of residues (%)	Peak degradation temperatures ($^{\circ}\text{C}$)
Pure PA6	0.92	434
Ker.30%/PA6'	2.04	436
Ker.30%/PA6	2.29	432
Ag.1%-ker.30%/PA6	22.6	417
Ag.10%-ker.30%/PA6	30.1	411
Ker.50%/PA6	8.21	426
Ker.70%/PA6	13.27	408

Table S3. The peak melting temperature of the composite membrane.

Samples	Peak melting temperature (°C)	
Pure PA6	207	218
Ker.30%/PA6'	214	225
Ker.30%/PA6	219	230
Ag.1%-ker.30%/PA6	215	230
Ag.10%-ker.30%/PA6		196
Ker.50%/PA6	212	229
Ker.70%/PA6		209