# Supporting Information

## Flexible Hydroxyapatite Ultralong Nanowires-Based Paper for Highly Efficient and Multifunctional Air Filtration

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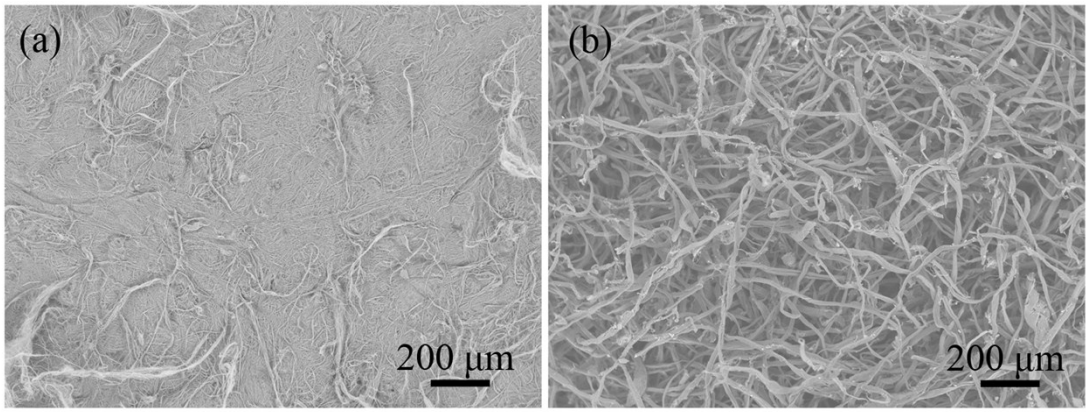


**Fig. S1** SEM images at low magnification: (a) ultralong HAP nanowires; (b) CT fibers.

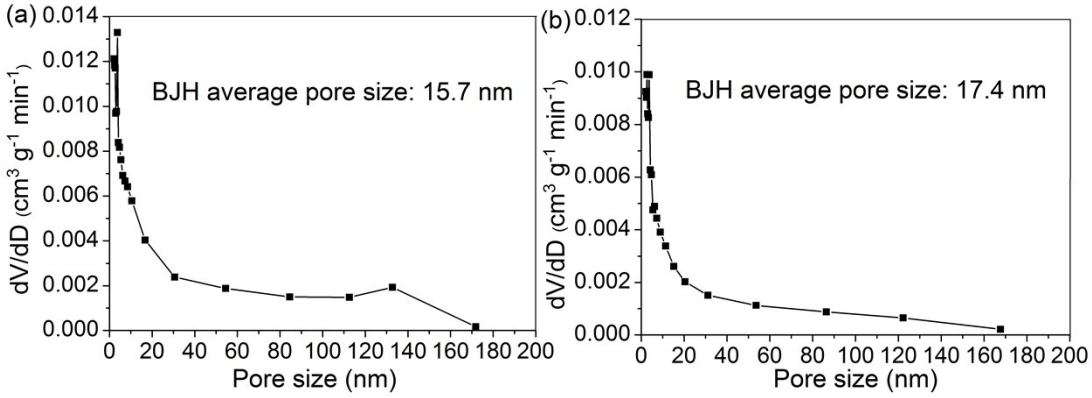


**Fig. S2** BJH desorption pore size distribution curves: (a) ultralong HAP nanowire paper; (b) the as-prepared HAP/CT air filter paper.

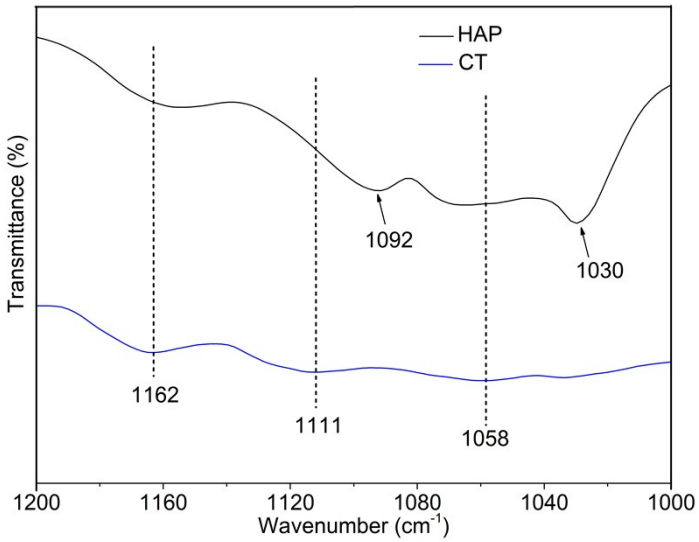


**Fig. S3** FTIR spectra of ultralong HAP nanowires and CT fibers at the wavenumbers ranging from 1000 to 1200 $cm^{-1}$.

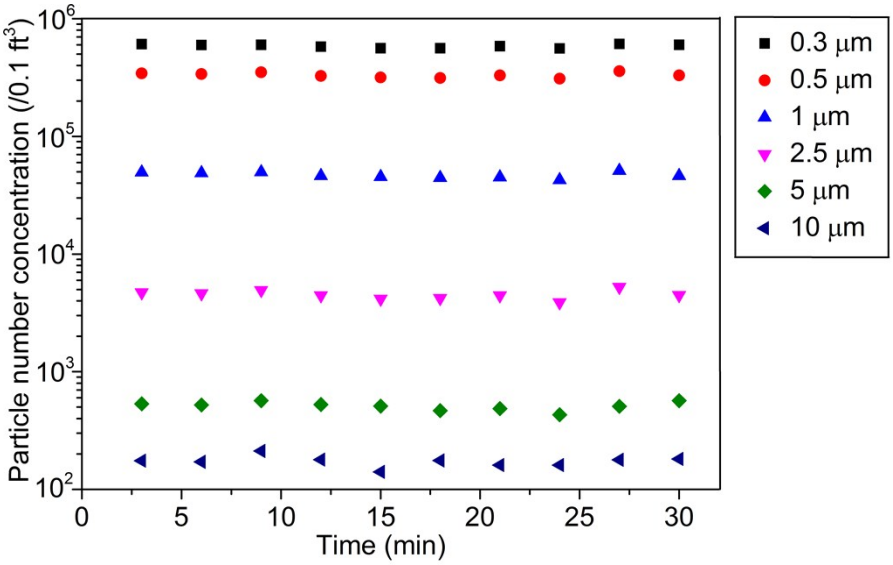


**Fig. S4** Size distribution of PM particles generated by burning incense during the testing process.

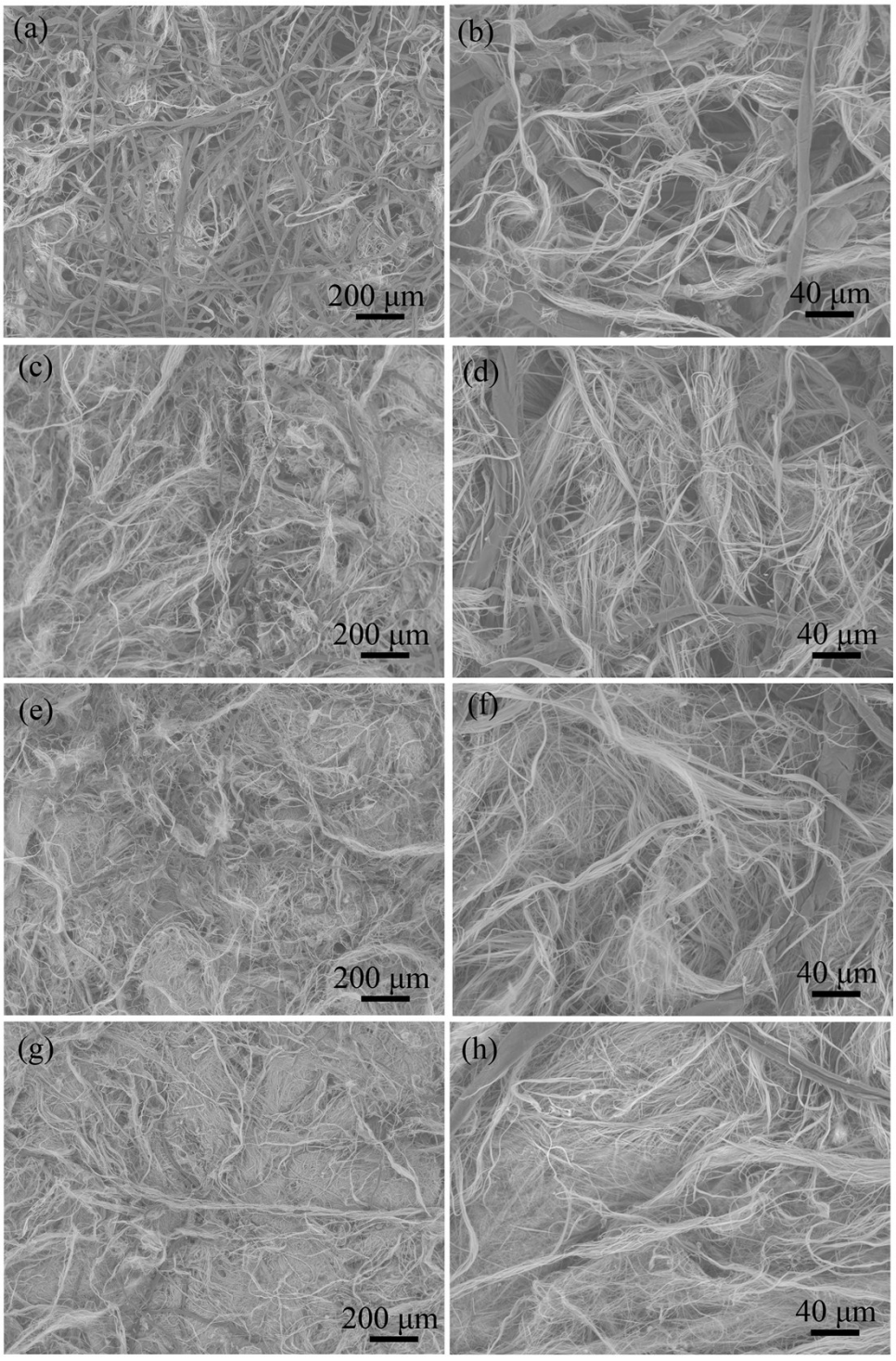


**Fig. S5** SEM images of the as-prepared HAP/CT air filter paper sheets with four different weight ratios of HAP/CT: (a, b) 1:4, (c, d) 2:3, (e, f) 3:2 and (g, h) 4:1. Note: the images in Fig. S5e and S5f are also shown in Fig. 2d and 2e.

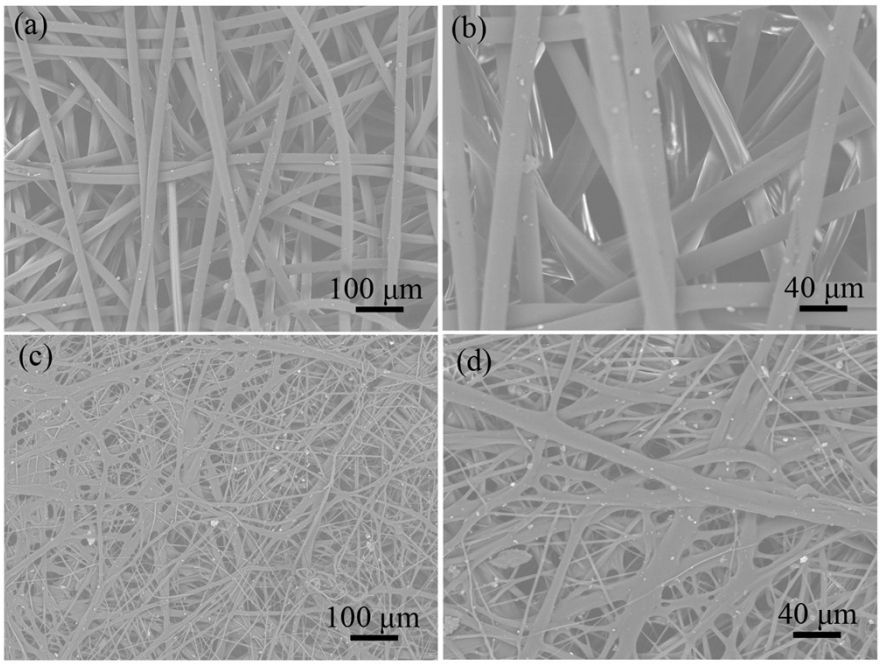


**Fig. S6** SEM images: (a, b) the commercial breathing mask-1#; (c, d) the commercial breathing mask-2#.

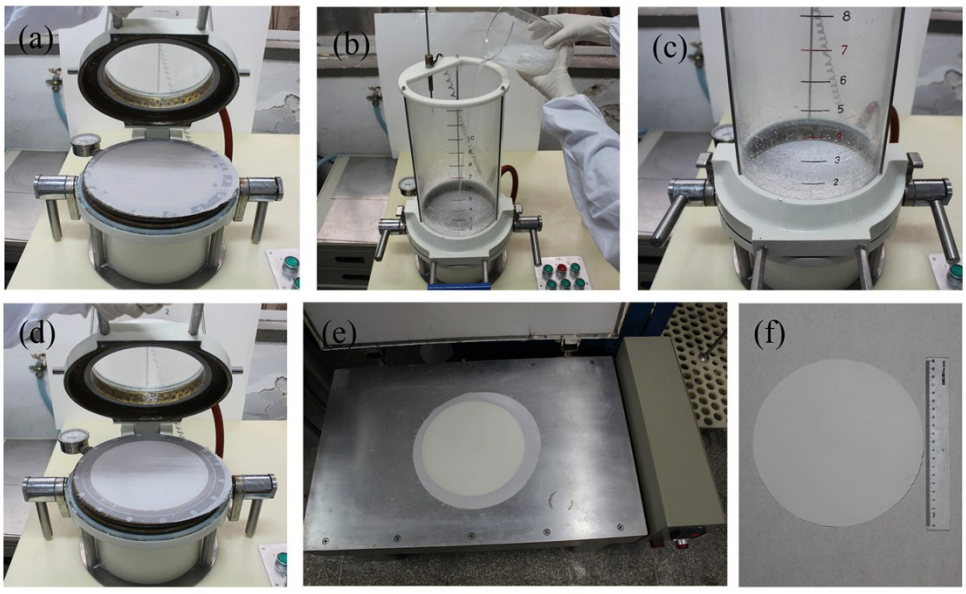


**Fig. S7** Schematic illustration of the fabrication process of the free-standing HAP/CT air filter paper. (a) a commercial sheet former; (b) the homogeneous suspension containing ultralong HAP nanowires and CT fibers is poured into the sheet former; (c) suction filtration by a vacuum pump; (d) the as-prepared HAP/CT air filter paper on the sheet former; (e) drying treatment at 95 $^{o}$C for 10 min; (f) a free-standing HAP/CT air filter paper sheet with a diameter of 20 cm.

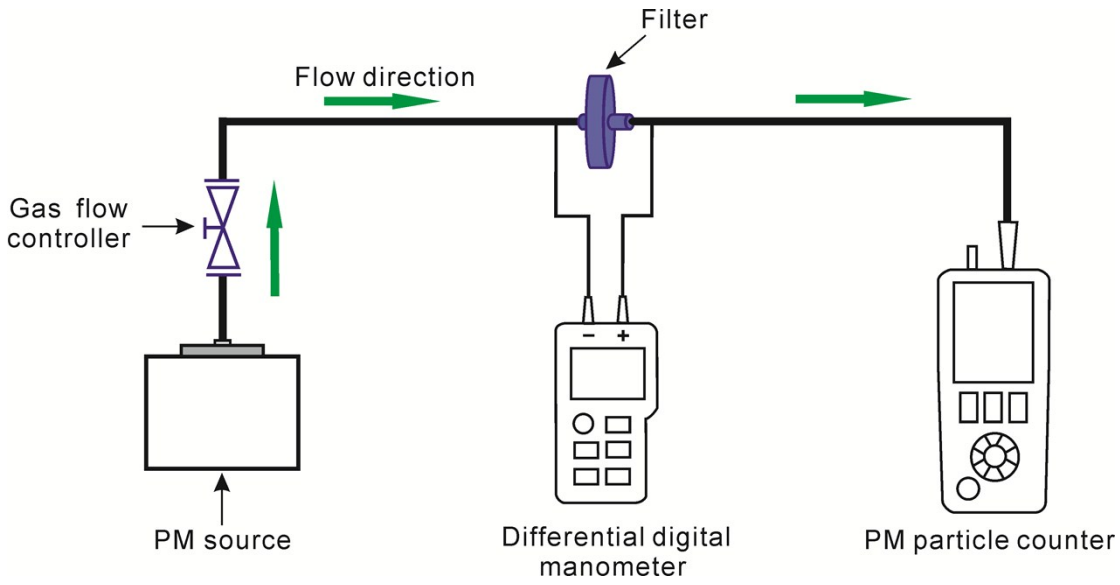


**Fig. S8** Schematic illustration of the testing system for the measurement of the removal efficiency of PM, and pressure drop.

For the filter test method and filtration theory, readers may refer to the following reference:

M. He, S. Dhaniyala, and M. Wagner, Characterization of filter performance under low-pressure operation, *Aerosol Science and Technology*, 2016, **50**, 417–428.