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

Electronic Supplementary Information (ESI)

Table S1 Hydrogels samples composition

Sample	Ag-HEC (wt%)	HEC (wt%)	K-Carrag. (wt%)	Agarose (wt%)	Chitosan (wt%)	H_2O (wt%)
Blank 1	-	0.25	1.50	-	0.50	97.75
Blank 2	-	0.50	1.50	-	-	98.00
Ag-HEC/K-Carr	5	-	1.50	-	-	93.50
Ag-HEC/Agar	5	-	-	1.50	-	93.50
Ag-HEC/K-Carr/Chit	5	-	1.50	-	0.50	93.50
Ag-HEC/Agar/Chit	5	-	-	1.50	0.50	93.50

The metal concentration of Ag-HEC nanosol is 0.5 wt % and the corresponding content of Ag in the four (wet) gels is 0.025 wt %. After drying the concentration of Ag in the dried scaffolds increased to 1.37 wt % for Ag-HEC/K-Carr and Ag-HEC/Agar and to 1.07 wt % for Ag-HEC/K-Carr/Chit and Ag-HEC/Agar/Chit.

Table S2 Digestive process applied to nonwoven textile samples

Steps	Time (min)	Power applied (W)
1	2	250
2	5	0
3	4	250
4	4	400
5	1	600
Vent	5	0

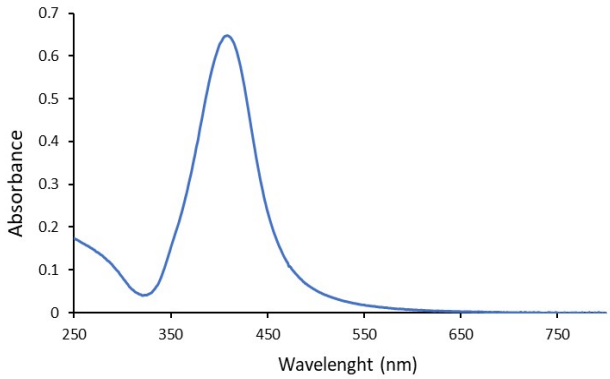

Fig. S1 Absorbance spectrum of Ag NPs dispersed in MilliQ water.

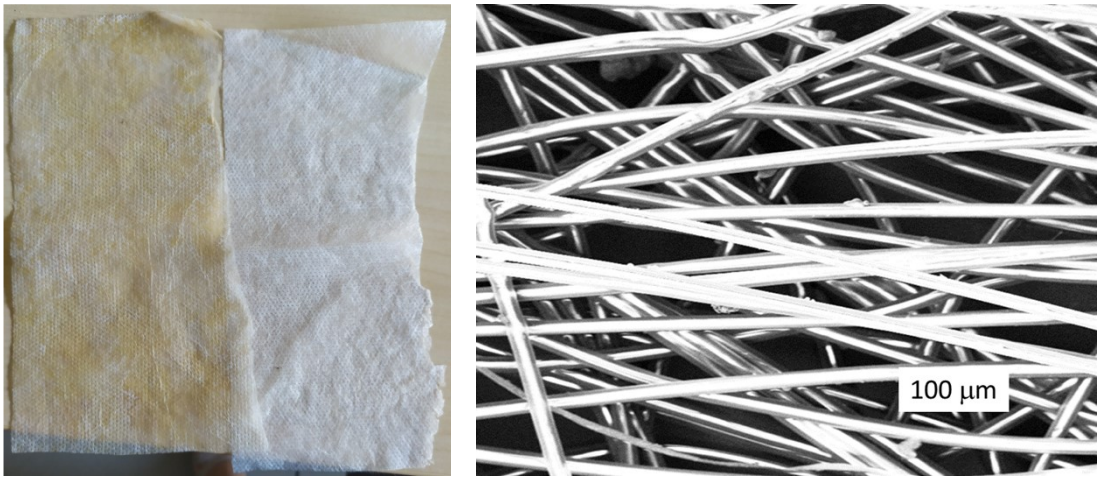

Fig. S2 Photograph of treated (yellow) and untreated (white) nonwoven sample and FE-SEM image of Ag-nonwoven fibers.

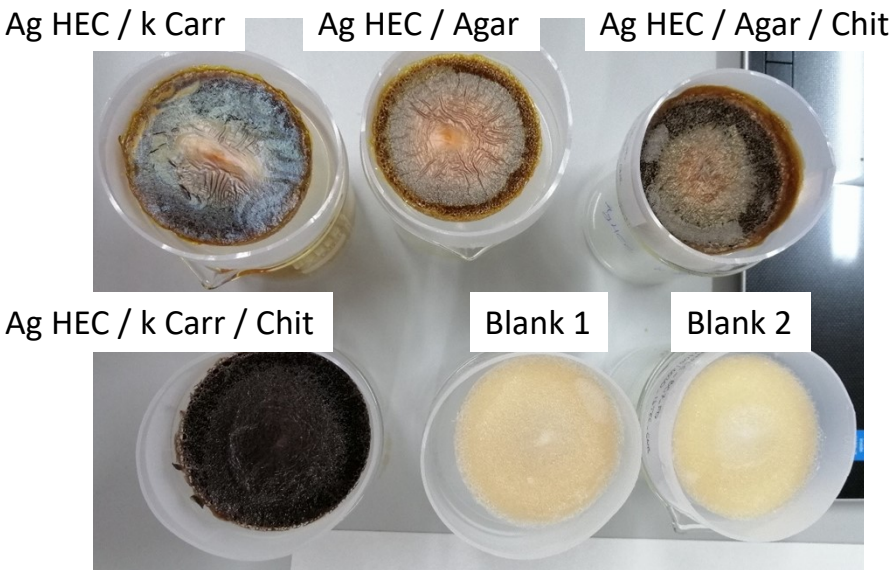

Fig. S3 Picture of freeze-dried Ag-HEC hydrogels tested.

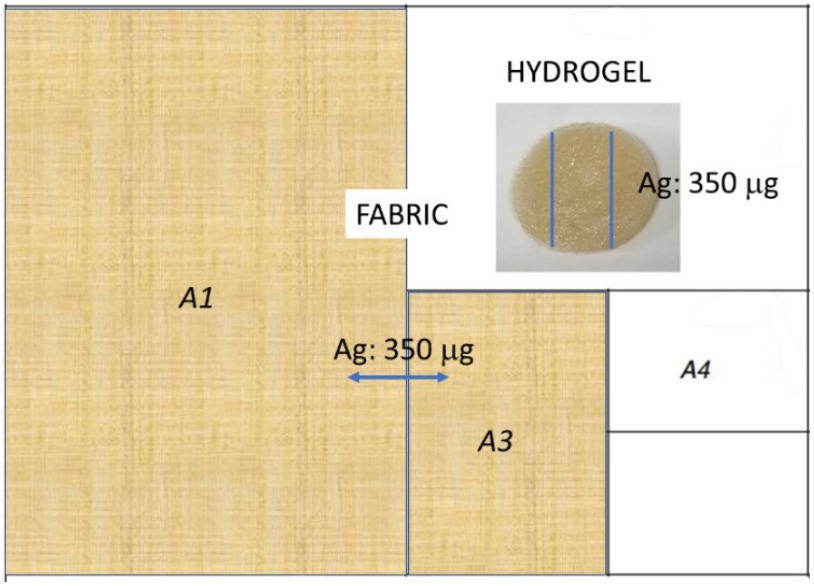

Fig. S4 Amount of Ag fabrics and hydrogel, potentially delivering 350 µg of Ag (reference dose estimated by EPA per person daily).

Physicochemical characterization

Ag-HEC nanosol. The colloidal properties of Ag-HEC nanosol (0.5 wt % of Ag) were measured using a Zetasizer Nano ZSP (model ZEN5600, Malvern Instruments, UK). NANoREG D2.08 protocol ("NANoREG D2.08 SOP 02 For measurement of hydrodynamic Size-Distribution and Dispersion Stability by DLS | RIVM," n.d.) was followed for the assessment of the average hydrodynamic diameter (ØDLS) and polydispersity index (PDI). Zeta potential measurements (ZP) were performed by electrophoretic light scattering (ELS) and the Smoluchowski equation was applied to convert the electrophoretic mobility to ZP. Ag-HEC nanosol was diluted 1:100 (in volume) in MilliQ water for DLS and ZP analysis. Mean diameter and ZP were calculated over 3 samples and 10 repeated measurements for each sample. The hydrodynamic diameter was compared with the diameter of the primary particles derived by transmission electron microscopy (TEM) images collected by an EM208, operating at 200 kV (Philips, Eindhoven, The Netherlands), with a high definition acquisition system based on a side-mounted TEM camera OSIS Morada and an iTEM software platform (Olympus Soft Imaging Solutions GmbH, Münster, Germany). For TEM observations Ag-HEC nanosol, diluted 1:100 in MilliQ water, was placed onto a carbon-coated grid and dried at room temperature under vacuum. The surface plasmonic resonance band (SPR) of Ag-HEC nanosol diluted (1:100) was analysed by using a UV/VIS/NIR spectometer Lambda 750 (PerkinElmer). The Ag^+ ions content of Ag-HEC nanosol, relevant to establish the $Ag^+ \rightarrow Ag$ NPs conversion yield and to assess the amount of potentially toxicant agents, was measured by inductively coupled plasma optical emission spectrometry using an ICP-OES 5100 – vertical dual view apparatus coupled with OneNeb nebulizer (Agilent Technologies, Santa Clara, CA, USA). The suspensions were diluted at 50 mg L^{-1} in MilliQ water or DMEM medium and ultrafiltrated trough a 0.22 µm PES filter extracting the ions fraction. The extracted media were then treated by nitric acid (10% in volume) and analyzed.

Ag-HEC hydrogel. In order to calculate the swelling capacity and dissolution in water (stability), the hydrogels were oven dried at 65°C, weighted (Wd) and then soaked into 100 mL of water for 1 hour. The swelled gel was weighted (Ws) and the Swelling (%) calculated as follows:

$$Swelling\ (\%) = \frac{Ws - Wd}{Wd} \times 100 \quad (Eq.\ 3)$$

The swelled samples were dried again, weighted (Wsd) and dissolution (%) calculated as follows:

$$Dissolution\ (\%) = \frac{Wd - Wsd}{Wd} \times 100 \quad (Eq.\ 4)$$

Isolation of SARS-CoV-2 from nasal-pharyngeal swabs. SARS-CoV-2 was isolated from 500 µL of nasal-pharyngeal swab, added to Vero cells at 80% confluence; the inoculum was removed after a 3-hour incubation at 37 °C with 5% CO_2 and the cells were incubated at 37 °C, 5% CO_2, for 72 hours, when cytopathic effects (CPE) was evident.

Viral copy numbers in the cell supernatant were quantified via specific quantitative real-time RT-PCR (qRT-PCR). SARS-CoV-2 was precipitated by means of PEG, following the manufacturer's instruction, and viral titer was determined by plaque assay, using dilution factors ranging from 10 to 10^9. The complete nucleotide sequence of the SARS-CoV-2 isolated strain was deposited at Gen Bank, at NCBI (accession number: MT748758).