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

Supporting Information for

Performance of Silver Nanoparticle-Impregnated Ovoid Ceramic Water Filters

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Table S1: Manufacturing details

Clay	Percent
Plainsman 3D Clay Ore	33.7
Plainsman M2 Clay Ore	33.7
Kentucky OM 4 Clay Ore	11.1
Kyanite (refractory sand)	3.2

All of the filters were made with the clay mix in Table S1. Three of the CWFs manufactured for this study were made using 21 % wt. sawdust that was screened using a sieve with 595 μm openings. One of the AgNP coated filters was made with sawdust that had been screened twice with the 595 μm sieve and then with a 250 μm sieve. The sawdust that passed the 250 μm screen was discarded, so it was slightly coarser in that filter. This filter was also made with a smaller amount of sawdust (17% wt.).

Table S2: Reagents for influent solutions

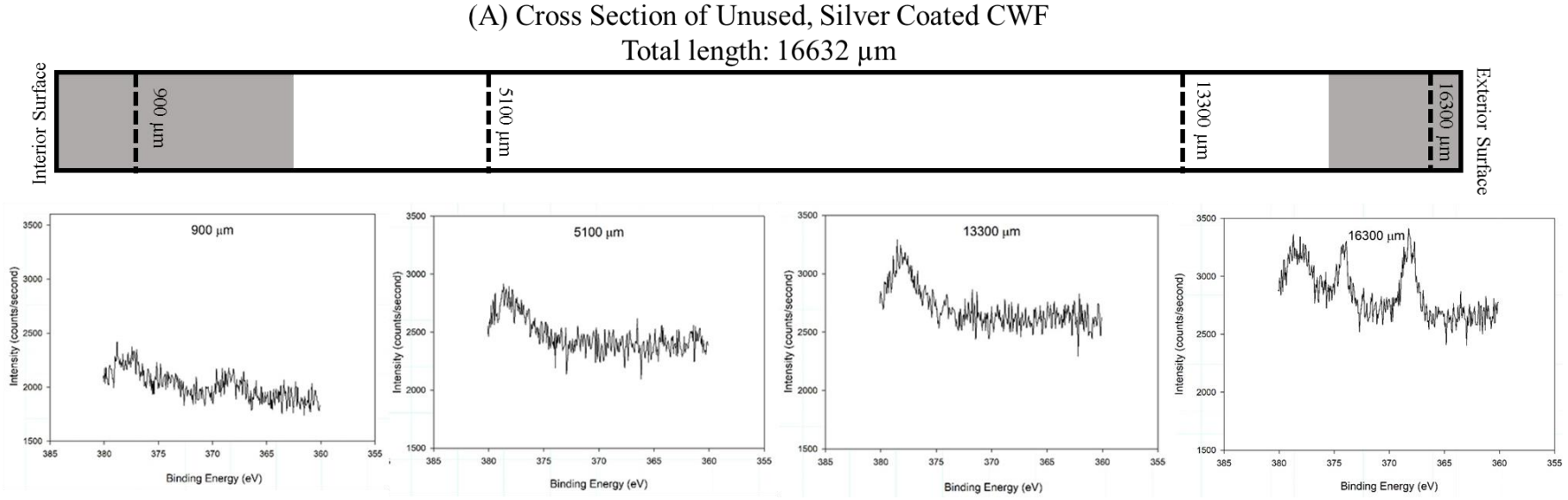
	General Input	Challenge Input	Leaching Input
Days	1-6	7-11	12-13
pH	N/A	adjusted with NaOH	adjusted with HCl
E. coli K12 (ATCC 25404)	10^9 CFU/L	10^9 CFU/L	0 CFU/L
Total Organic Carbon	3 mg/L humic acid	15 mg/L humic acid	1.0 mg/L humic acid
Turbidity	N/A	330 mg/L kaolinite	N/A
Temperature (°C)	N/A	N/A	N/A
Total Dissolved Solids	300 mg/L sea salt	1500 mg/L sea salt	100 mg/L sea salt

Figure S1: Experimental set up

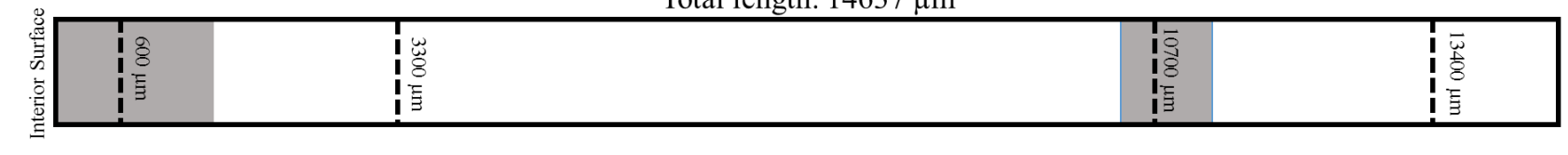
Samples were collected from the plastic buckets underneath the CWFs.

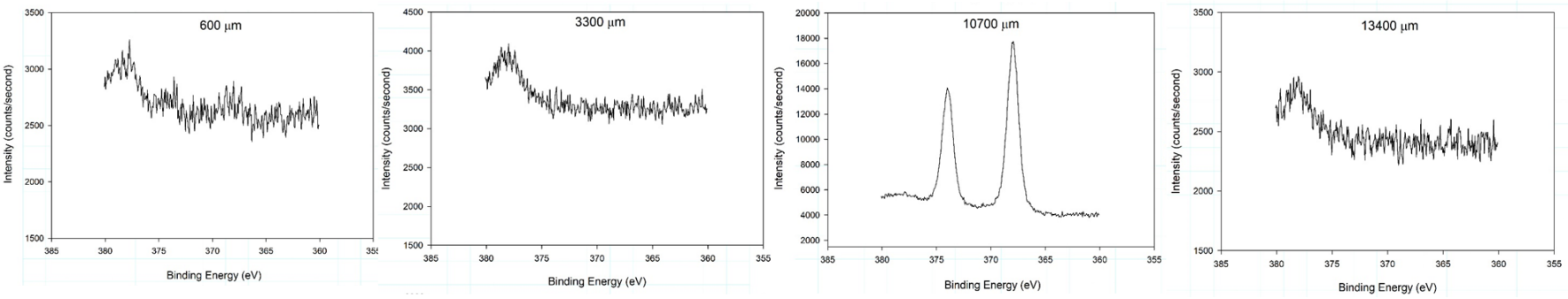
Figure S2: Selected XPS Spectra

The following figures showcase the distribution of silver nanoparticles through the matrix of the ceramic. The presence of silver was determined by peaks on the XPS at 367 and 373 eV. The signal to noise ratio is high due to the complex minerology of the clays used in the CWFs. Each cross section is presented as a bar with the interior and exterior surfaces labelled. The total length of the cross section is noted as well. Note that while the cross sections may differ in thickness, XPS analysis was of the entire cross section. Gray sections indicate areas where silver was found. A selection of spectra are presented as representative samples for different areas of the cross section. Dotted lines indicate roughly where the spectra acquired on the cross section.

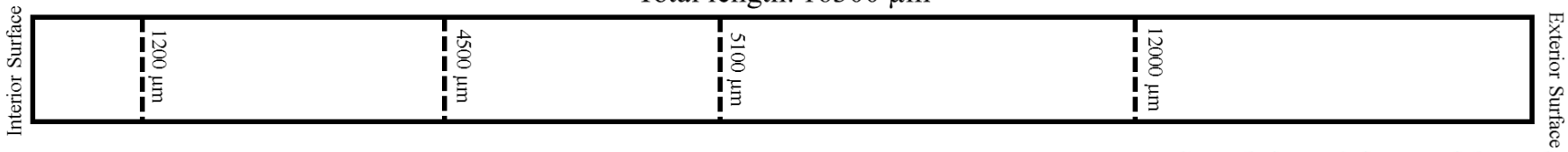


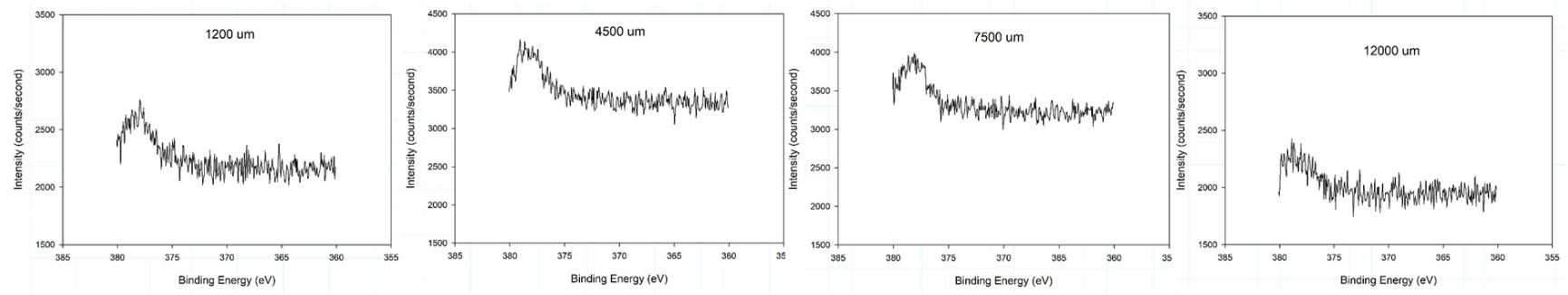
(B) Cross Section of a Used, Silver Coated CWF
Total length: 14637 µm





(C) Cross Section of Unused, Uncoated CWF
Total length: 16300 µm





(D) Cross Section of a Used, Uncoated CWF
Total length: 14393 µm

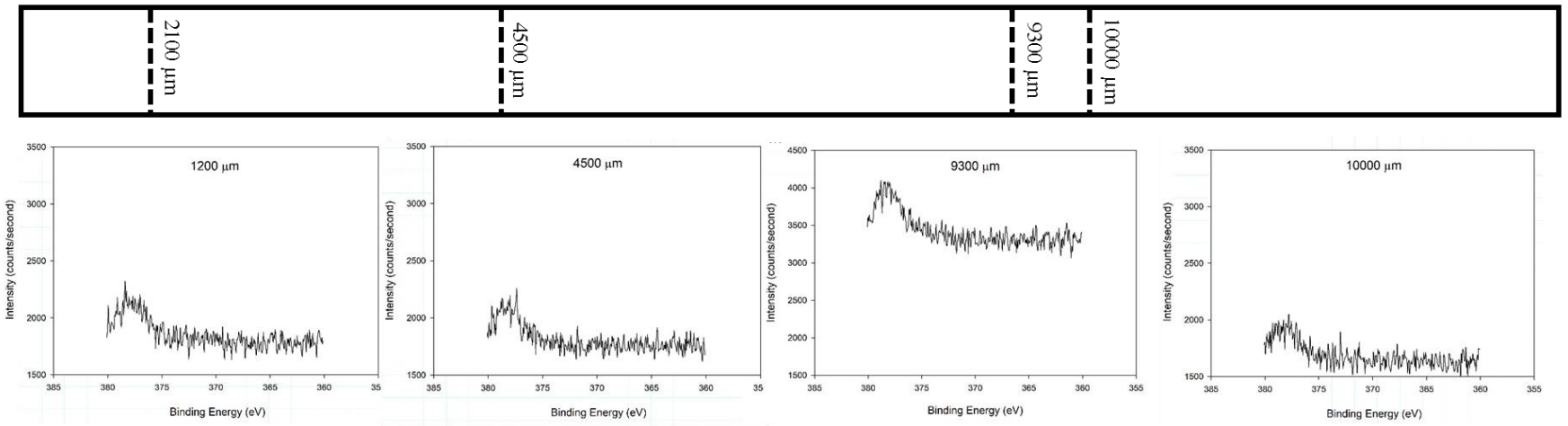
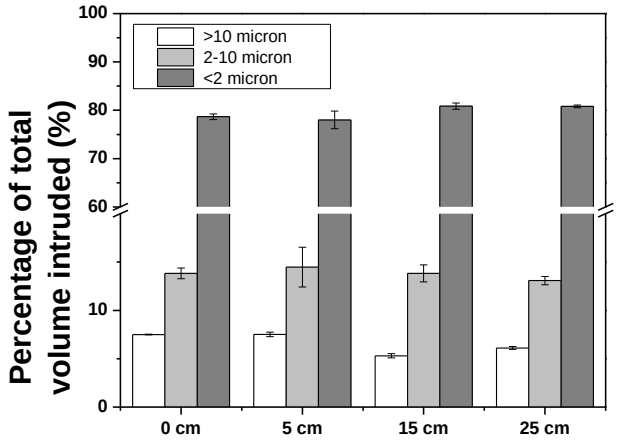


Figure S3: Pore size distributions



Samples shown here were removed from an unused ovoid CWF. Results were calculated as the volume intruded over a given pore size fraction divided by the total volume intruded. White indicates pores with a diameter greater than 10 µm. Light gray bars represent diameters 2-10 µm. Dark gray bars are pores with a diameter less than 2 µm. Error bars are standard deviation (n=2). The measurements on the X axis of Figure S2 refer to the distance a sample was taken from the bottom of the filter. Samples were taken from different locations going up the wall of the CWF to determine if the pore size distribution changes as a function of wall height.

Table S3: Average pore sizes as determined by mercury intrusion porosimetry.

Sample*	Average (µm)
0 cm	2.49±0.01
5 cm	2.56±0.10
15 cm	1.87±0.03
25 cm	2.19±0.01

*Measurements refer to the distance from the bottom of the filter to the location from which samples were extracted.