gels

MDPI

Supplementary Materials

Poly(Ethylene Glycol) Diacrylate Hydrogel with Silver Nanoclusters for Water Pb(II) Ions Filtering

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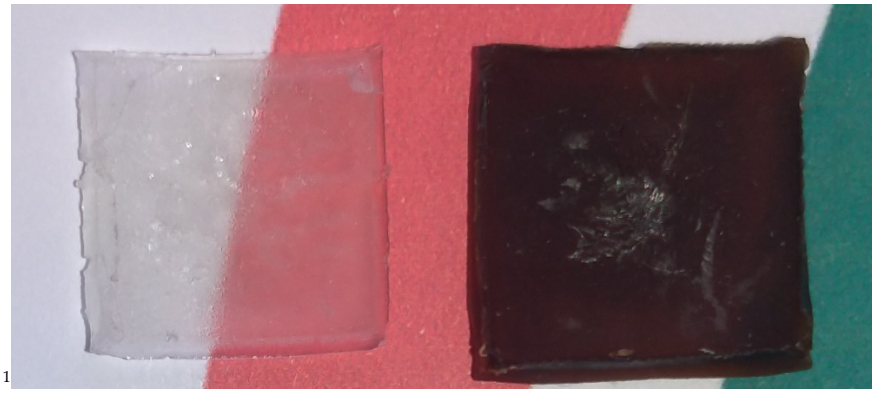

Figure S1. Picture of dried filters: unmodified PEGDA hydrogel (left); modified with AgNCs-PMAA hydrogel (right).

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Error analysis

The error in Removal Efficency (RE) in percentage was calculated according with the general propagation of error, by appling the following formula:

$$\delta_{RE} = \sqrt{\left[\frac{\partial_{RE}}{\partial_{C_i}}\delta_{C_i}\right]^2 + \left[\frac{\partial_{RE}}{\partial_{C_e}}\delta_{C_e}\right]^2} * 100 \qquad \text{(S1)}$$

Where δ_{C_i} and δ_{C_e} rapresent the absolute errors of initial and equilibrium concentrations, respectively.

About the error in adsorption capacity (q_e) [i.e. $\delta(q_e)$] was found by applying the general propagation error as follow:

$$\delta q_e = \sqrt{\left[\frac{\partial_{q_e}}{\partial_{C_i}}\delta_{C_i}\right]^2 + \left[\frac{\partial_{q_e}}{\partial_{C_e}}\delta_{C_e}\right]^2 + \left[\frac{\partial_{q_e}}{\partial_V}\delta_V\right]^2 + \left[\frac{\partial_{q_e}}{\partial_m}\delta_m\right]^2} \qquad \text{(S2)}$$

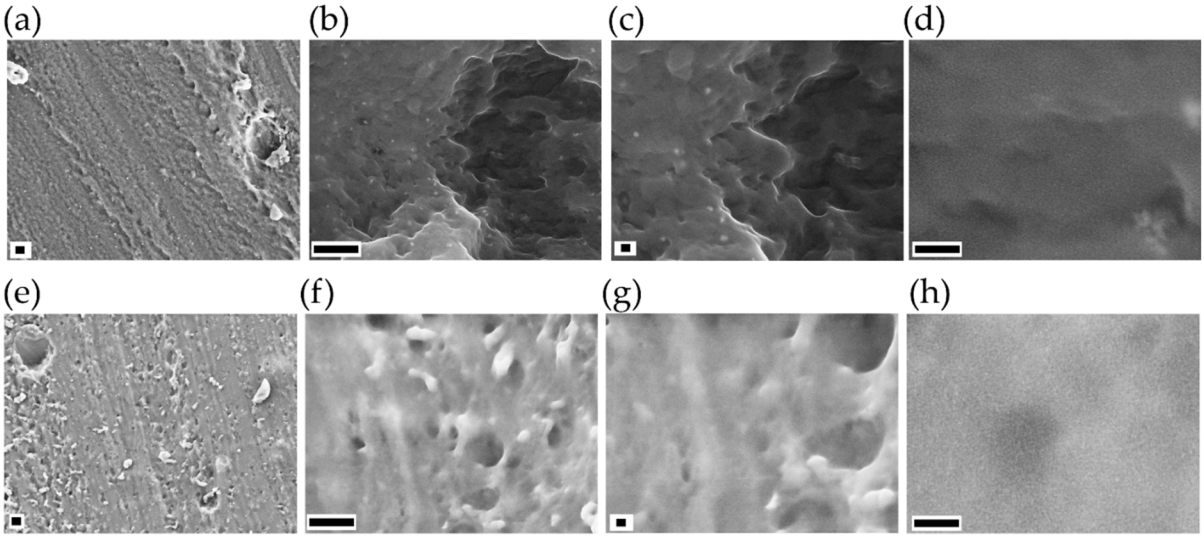

Figure S2. SEM images at different magnification of samples with 14%wt of PEGDA and without NCs (a)-(d) (from left to right: 10kX scale bare 1 μm, 50kX scale bar 1 μm, 100kX scale bar 100 nm, 500kX scale bar 100 nm); and with 255 mg of AgNCs-PMAA (e)-(h) (from left to right: 10kX scale bare 1 μm, 50kX scale bar 1 μm, 100kX scale bar 100 nm, 500kX scale bar 100 nm).

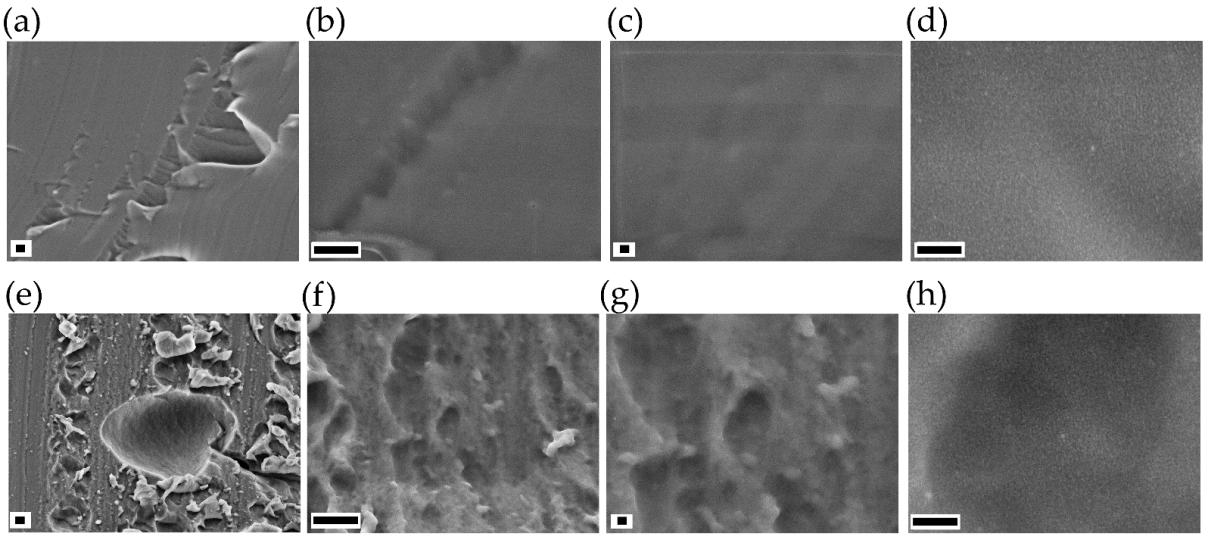

Figure S3. SEM images at different magnification of samples with 24%wt of PEGDA and without AgNCs (a)-(d) (from left to right: 10kX scale bare 1 μm, 50kX scale bar 1 μm, 100kX scale bar 100 nm, 500kX scale bar 100 nm); and with 180 mg of AgNCs-PMAA (e)-(h) (from left to right: 10kX scale bare 1 μm, 50kX scale bar 1 μm, 100kX scale bar 100 nm, 500kX scale bar 100 nm).

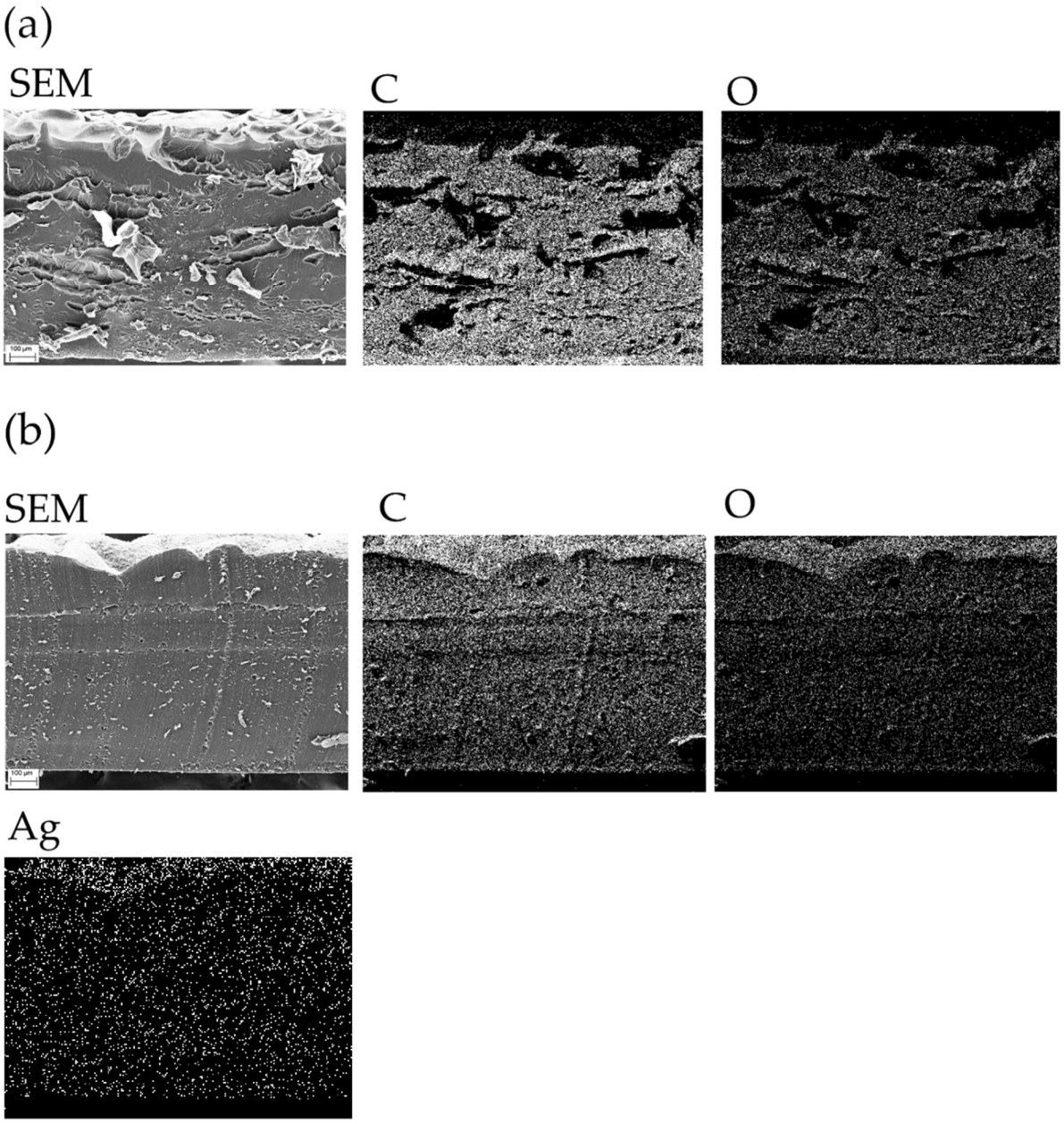

Figure S4. Map distributions of chemical elements of hydrogel samples after the filtration of 1500 ppm of Pb(II): (a) unmodified and (b) modified filters.

Table S1. Elemental composition of filters as a function of the different areas of interest. Samples were sputtered with gold prior to the analyses.

Sample	Area	Element	% in weight	Sample	Area	Element	%in weight
1-0	Top	C	56.45	1-C	Top	C	59.92
		O	41.39			O	29.35
		Au	0.39			Au	1.38
		Pb	1.77			Na	0.53
		Tot.	100.00			Ag	0.40
	Center	C	52.98			Pb	8.43
		O	46.13			Tot.	100.00
		Au	0.32		Center	C	51.36
		Pb	0.57			O	28.03

	Tot.	100.00
Bottom	C	58.56
	O	40.67
	Au	0.20
	Pb	0.57
	Tot.	100.00

	Au	2.68
	Na	1.32
	Ag	2.11
	Pb	14.50
	Tot.	100.00
Bottom	C	60.75
	O	32.39
	Au	0.48
	Na	0.58
	Ag	0.61
	Pb	5.18
	Tot.	100.00

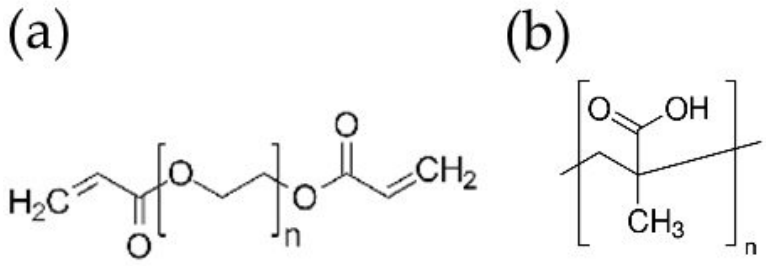

Figure S5. Chemical structure of PEGDA molecule (a) and PMAA molecule (b).