Supplementary information

MOF@*Cell*: 3D printed biobased filters anchored with a green metal-organic framework for effluent treatment

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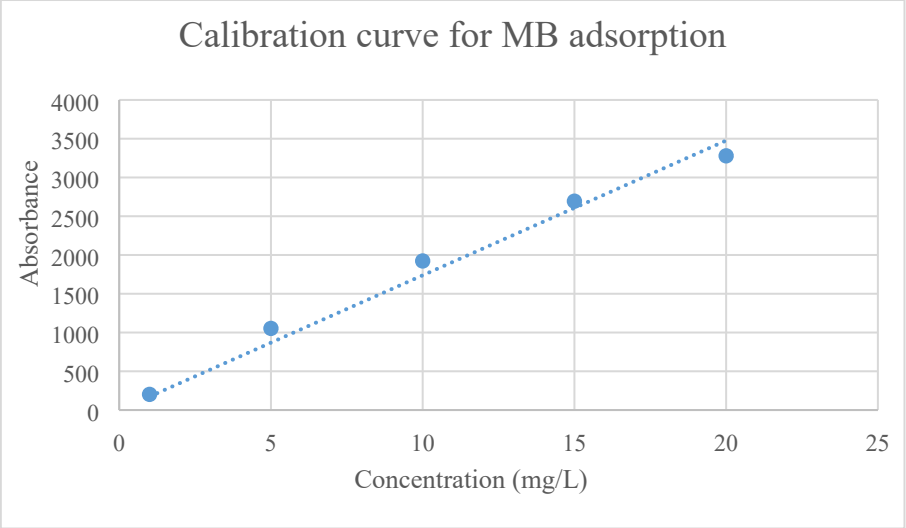


Figure S1. UV-Vis calibration curve for methylene blue (MB) adsorption.

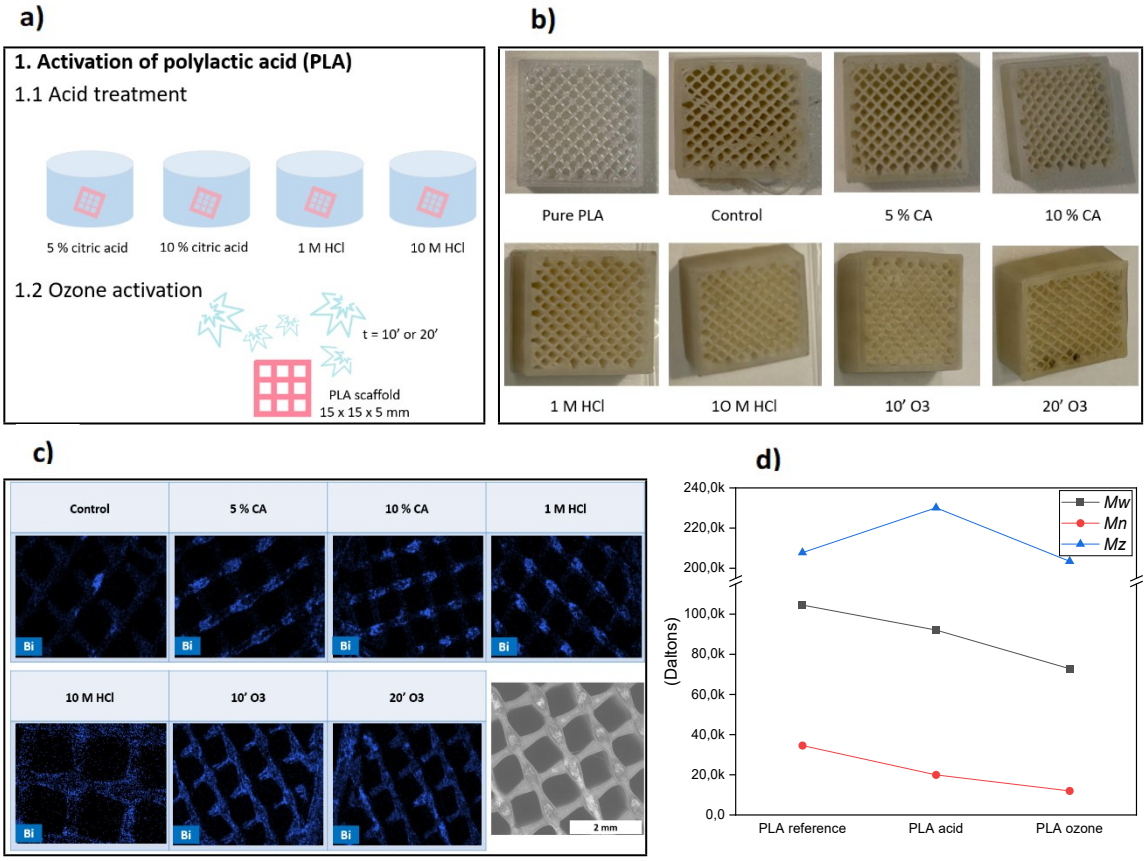
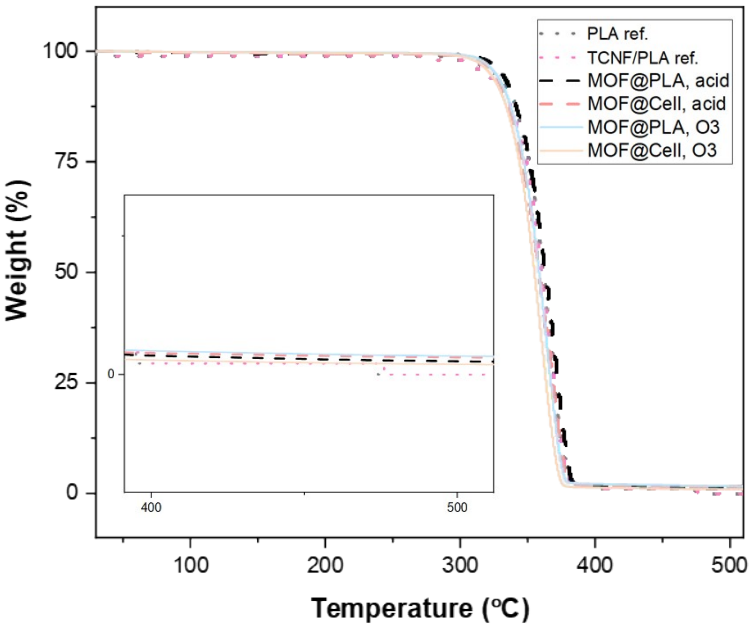


Figure S2. a) Overview of the optimization of the activation procedure; b) filters after activation and immersion in MOF suspension; c) SEM-EDX images with elemental mapping for (Bi) for the activated filters with anchored SU-101; d) changes of average molecular weights (*Mw*, *Mn*, *Mz*) of acid (10 M HCl) and ozone (10') activated PLA filters.

Sample	Weight of MOF per filter

a)



b)

MOF@PLA, acid	7.4 mg
MOF@Cell, acid	14.2 mg
MOF@PLA, ozone	9.8 mg
MOF@Cell, ozone	8.3 mg

Figure S3. a) Thermographs obtained for the MOF@filters and corresponding matrix materials; b) weight (mg) of SU-101 per filter as calculated with the use of TGA data.

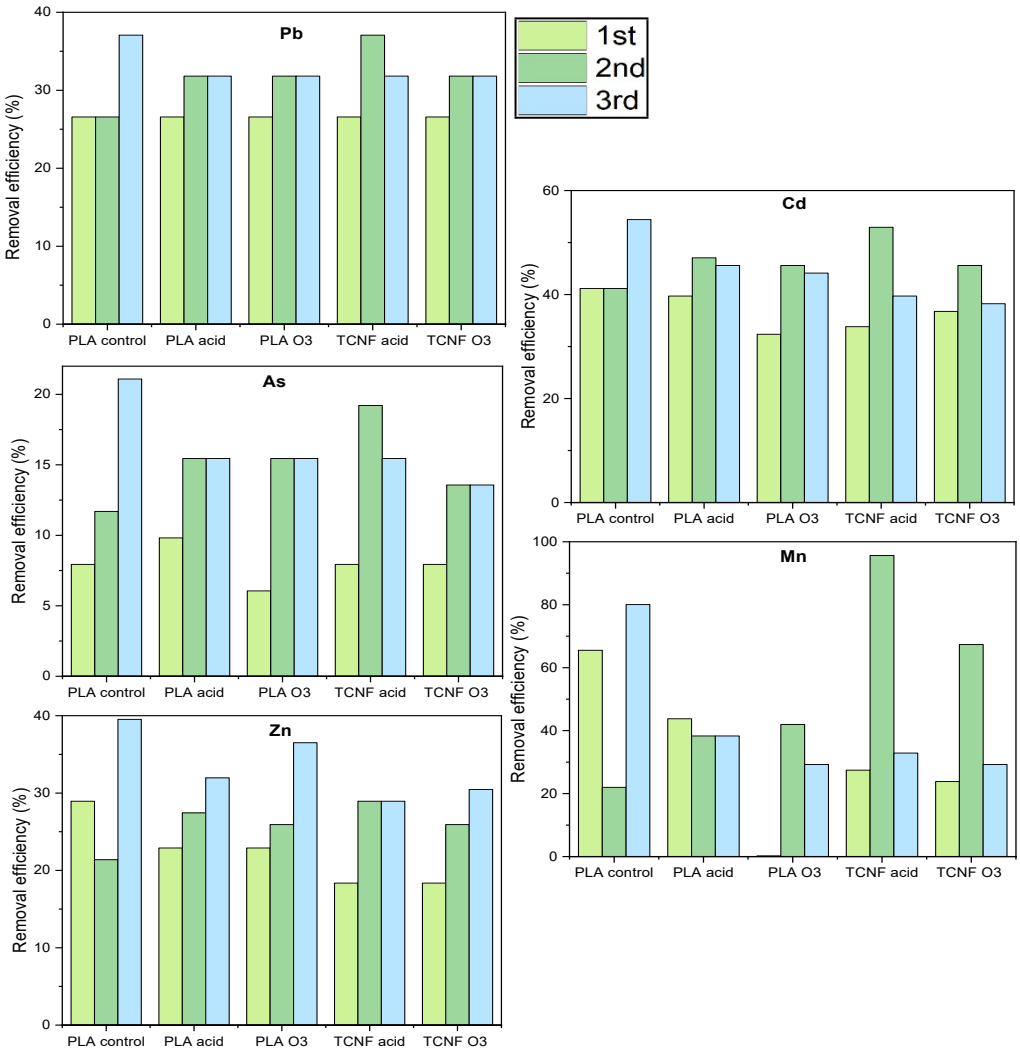


Figure S4. Adsorption efficiency for removal of various metal ions by MOF@filters after 1 h immersion in mine effluent as measured by ICP-

Table S1. Young's modulus and average toughness of all of the samples.

Sample	Young's modulus (MPa)	Average toughness (J/cm^3)
PLA reference	1159.8 ± 102	4.8 ± 2
MOF@PLA, acid	1089.4 ± 57	2.1 ± 1
MOF@PLA, O_3	1005.7 ± 228	5.0 ± 1
TCNF/PLA reference	1262.4 ± 128	8.7 ± 3.8
MOF@*Cell*, acid	1184.7 ± 89	6.9 ± 2.7
MOF@*Cell*, O_3	1172.7 ± 222	11.7 ± 0.8

Table S2. Adsorption efficiencies (%) as measured by ICP-MS for all the tested filters within each adsorption cycle.

Adsorption cycle and sample		Adsorption efficiency (%)				
		Pb (II)	**Mn (II)**	**As (III)**	**Cd (II)**	**Zn (II)**
i.	PLA control, 1 h	26.6	65.5	7.9	41.2	28.9
	MOF@PLA acid, 1h	26.6	43.8	9.8	39.7	22.9
	MOF@PLA, O_3, 1 h	26.6	0.2	6.1	32.4	22.9
	MOF@*Cell*, acid, 1 h	26.6	27.4	7.9	33.8	18.4
	MOF@*Cell*, O_3, 1 h	26.6	23.8	7.9	36.8	18.4
	PLA control, 24 h	31.8	69.2	9.8	51.5	22.9
	MOF@PLA acid, 24 h	31.8	56.5	13.6	50.0	35.0
	MOF@PLA, O_3, 24 h	31.8	5.7	7.9	44.1	28.9
	MOF@*Cell*, acid, 24 h	26.6	34.7	9.8	44.1	28.9
	MOF@*Cell*, O_3, 24 h	26.6	27.4	7.9	42.6	21.4
ii.	PLA control, 1 h	26.6	22.0	11.7	41.2	21.4
	MOF@PLA acid, 1h	31.8	38.3	15.5	47.1	27.4
	MOF@PLA, O_3, 1 h	31.8	42.0	15.5	45.6	25.9
	MOF@*Cell*, acid, 1 h	37.1	95.6	19.2	52.9	28.9
	MOF@*Cell*, O_3, 1 h	31.8	67.3	13.6	45.6	25.9
	PLA control, 24 h	37.1	29.3	15.5	47.1	35.0
	MOF@PLA acid, 24 h	31.8	52.8	15.5	52.9	39.5
	MOF@PLA, O_3, 24 h	37.1	51.0	17.3	55.9	42.6
	MOF@*Cell*, acid, 24 h	37.1	60.1	21.1	57.4	39.5
	MOF@*Cell*, O_3, 24 h	42.3	72.8	21.1	47.1	41.0
	PLA control, 1 h	37.1	80.0	21.1	54.4	39.5
	MOF@PLA acid, 1h	31.8	38.3	15.5	45.6	32.0

iii.	MOF@PLA, O_3, 1 h	31.8	29.3	15.5	44.1	36.5
	MOF@*Cell*, acid, 1 h	31.8	32.9	15.5	39.7	28.9
	MOF@*Cell*, O_3, 1 h	31.8	29.3	13.6	38.2	30.5
	PLA control, 24 h	61.2	85.7	26.7	67.6	56.2
	MOF@PLA acid, 24 h	42.3	49.2	19.2	57.4	45.6
	MOF@PLA, O_3, 24 h	42.3	45.6	17.3	58.8	12.3
	MOF@*Cell*, acid, 24 h	37.1	58.3	17.3	52.9	36.5
	MOF@*Cell*, O_3, 24 h	37.1	38.3	17.3	55.9	44.1