

## Standardization of microwave-assisted extraction procedures for characterizing metallic nanoparticles in environmental solid samples by means single particle ICP-MS.

Carlos Gómez-Pertusa, M. Carmen García-Poyo, Guillermo Grindlay,  
Ricardo Pedraza, Adela Yañez, Luis Gras

**Table S1.** Particle number recovery and average size of PtNPs obtained in soil samples after an extraction treatment by using the SMO and DMO. Power 800W; NaOH concentration 0.1 M; extraction time 6min. Results are expressed as the mean value $\pm$ s, n=5.

	Particle size/ nm	Recovery/ %	
		SMO	DMO
Reference	69 $\pm$ 2	-	-
Acid	69.1 $\pm$ 0.6	25 $\pm$ 5	92 $\pm$ 5
Sandy	68.7 $\pm$ 0.8	19 $\pm$ 8	95 $\pm$ 5
SL36	69.3 $\pm$ 0.7	19 $\pm$ 10	75 $\pm$ 4
Alkaline	68.8 $\pm$ 1.3	15 $\pm$ 3	78 $\pm$ 6
ERM CC141	68.2 $\pm$ 1.1	15 $\pm$ 3	76 $\pm$ 12
ERM 483	69.1 $\pm$ 0.9	7.6 $\pm$ 1.3	73 $\pm$ 4
Clayey	68.3 $\pm$ 0.8	0.31 $\pm$ 0.12	9.9 $\pm$ 1.9

**Table S2.** Platinum particle number recovery response in sandy soil for CCD design. Results are expressed as the mean value $\pm$ s, n=3.

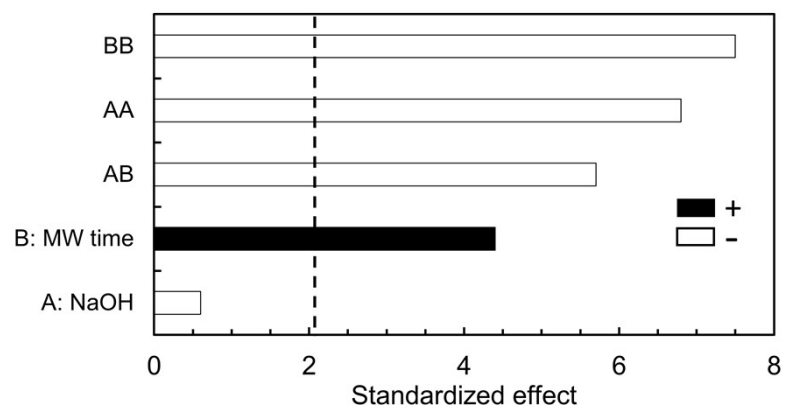
	<b>Concentration/ M</b>	<b>MW time/ min</b>	<b>Recovery/ %</b>
1	0.01	2.5	9.2 $\pm$ 0.7
2	0.1	1	25 $\pm$ 5
3	0.5	2.5	28 $\pm$ 4
4	0	7.5	39 $\pm$ 9
5	0.1	7.5	78 $\pm$ 4
6	1	7.5	44 $\pm$ 2
7	0.01	15	49 $\pm$ 10
8	0.1	20	61 $\pm$ 6
9	0.5	15	22 $\pm$ 2

**Table S3.** Platinum particle number recovery response in air filters for CCD design. Results are expressed as the mean value $\pm$ s, n=3.

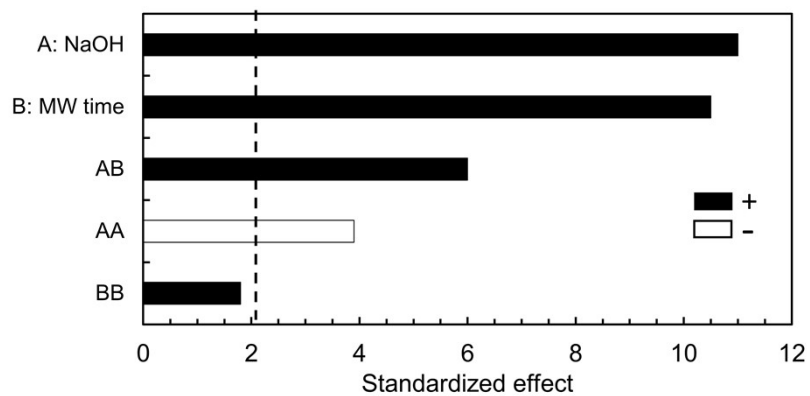
	<b>Concentration/ M</b>	<b>MW time/ min</b>	<b>Recovery/ %</b>
1	0	1	14 $\pm$ 2
2	0.05	2	27 $\pm$ 3
3	0.1	2	34 $\pm$ 4
4	0.01	3	15 $\pm$ 2
5	0.05	3	42 $\pm$ 7
6	0.1	3	50 $\pm$ 9
7	0.01	4	25 $\pm$ 6
8	0.05	4	55 $\pm$ 9
9	0.5	5	77 $\pm$ 8

**Table S4.** PtNPs particle number and average size distributions obtained after the SMO treatment with and without centrifugation. Results are expressed as the mean value $\pm$ s, n=3. Reference value obtained by TEM, 69 $\pm$ 2nm.

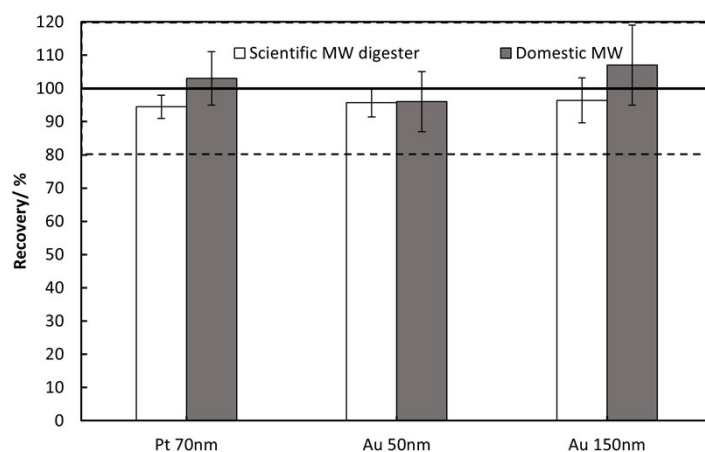
	<b>Size/ nm</b>	<b>Particle number/ NPs mL<sup>-1</sup></b>
No centrifugation	68.6 $\pm$ 0.7	1.34 $\pm$ 0.08 $\cdot$ 10 <sup>4</sup>
Centrifugation	69.1 $\pm$ 0.9	1.32 $\pm$ 0.06 $\cdot$ 10 <sup>4</sup>



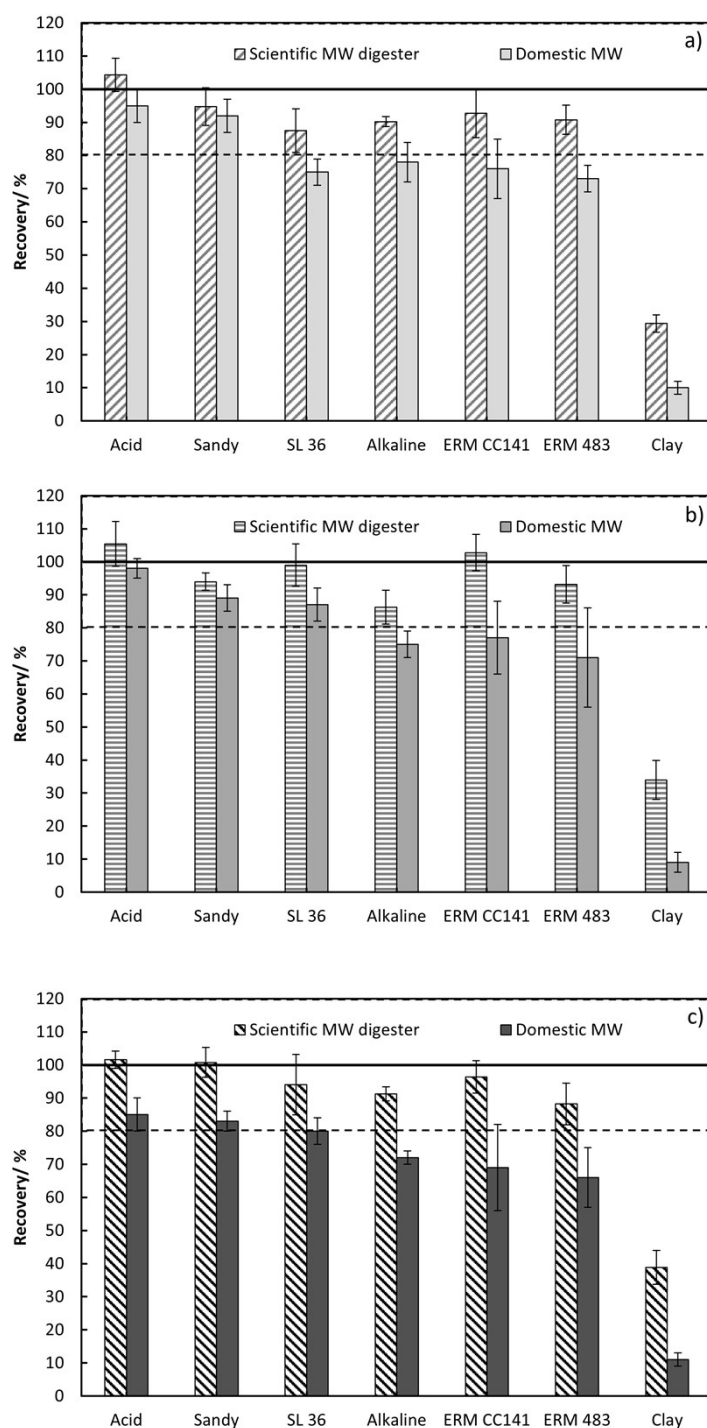
**Figure S1.** Pareto chart obtained in the optimization study of the main variables affecting PtNPs MW-extraction in sandy soil. Dashed line indicates Pareto chart threshold.



**Figure S2.** Pareto chart obtained in the optimization study of the main variables affecting PtNPs MW-extraction in air filters. Dashed line indicates Pareto chart threshold.



**Figure S3.** Platinum and AuNPs recoveries in air filters operating DMO and SMO devices. a) 70nm PtNPs, b) 50nm AuNPs and c) 150nm AuNPs. Error bars: standard deviation, n=5. Dashed lines limit the quantitative recovery interval.



**Figure S4.** Platinum particle recovery in soils operating DMO and SMO devices.

a) 70nm PtNPs, b) 50nm AuNPs and c) 150nm AuNPs. Error bars: standard deviation, n=5. Dashed lines limit the quantitative recovery interval.