

Trace metal sorption on nanoplastics: an innovative analytical approach combining surface analysis and mass spectrometry techniques.

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Table S1: Synthesis characteristics of PS22 and PS9 samples.

Echantillon	AA/Sty	Solid Content	[APS]/[Mono]	Conversion (%) ^b	Diameter (nm) ^c	PDI ^c
PS 9	0,09	10	$2 \cdot 10^{-3}$	92	340	0,07
PS 22	0,22			94	333	0,05

Figure S1: N₂ adsorption isotherms at 77K of PS9 and PS22 samples.

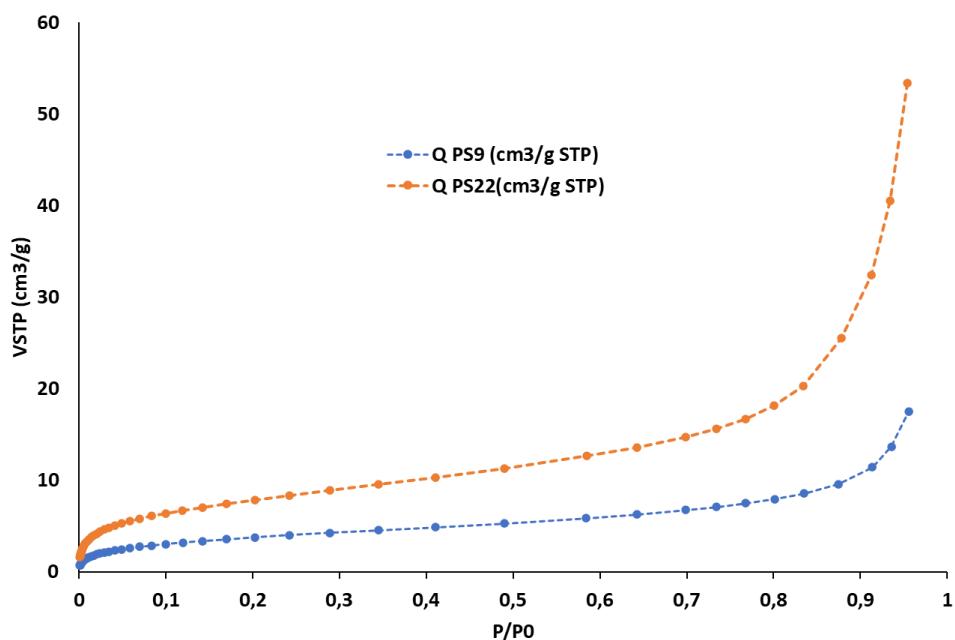


Figure S2: XPS survey spectra of PS22 (left) and PS9 (right) samples before copper exposition.

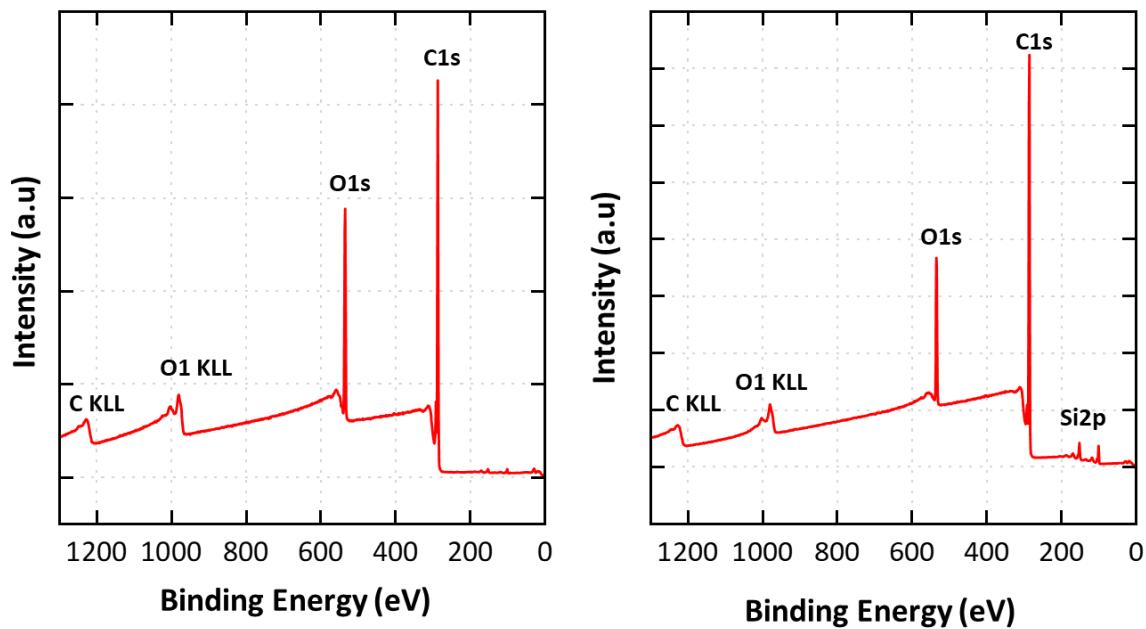


Figure S3: XPS survey spectra of PS22 (left) and PS9 (right) samples after copper exposition (24h at pH 5).

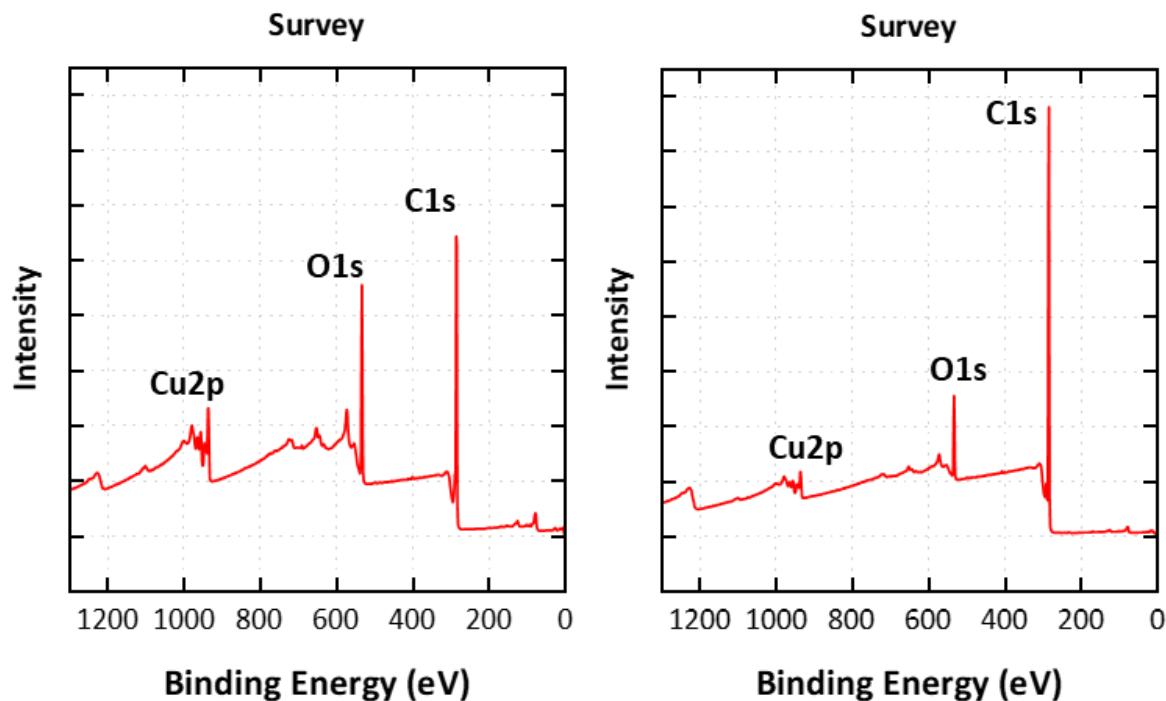


Figure S4: High resolution XPS spectra of PS22 and PS9 samples at pH 3 and 5 with a copper exposure of a) 24h; b) 48h and c) 144h.

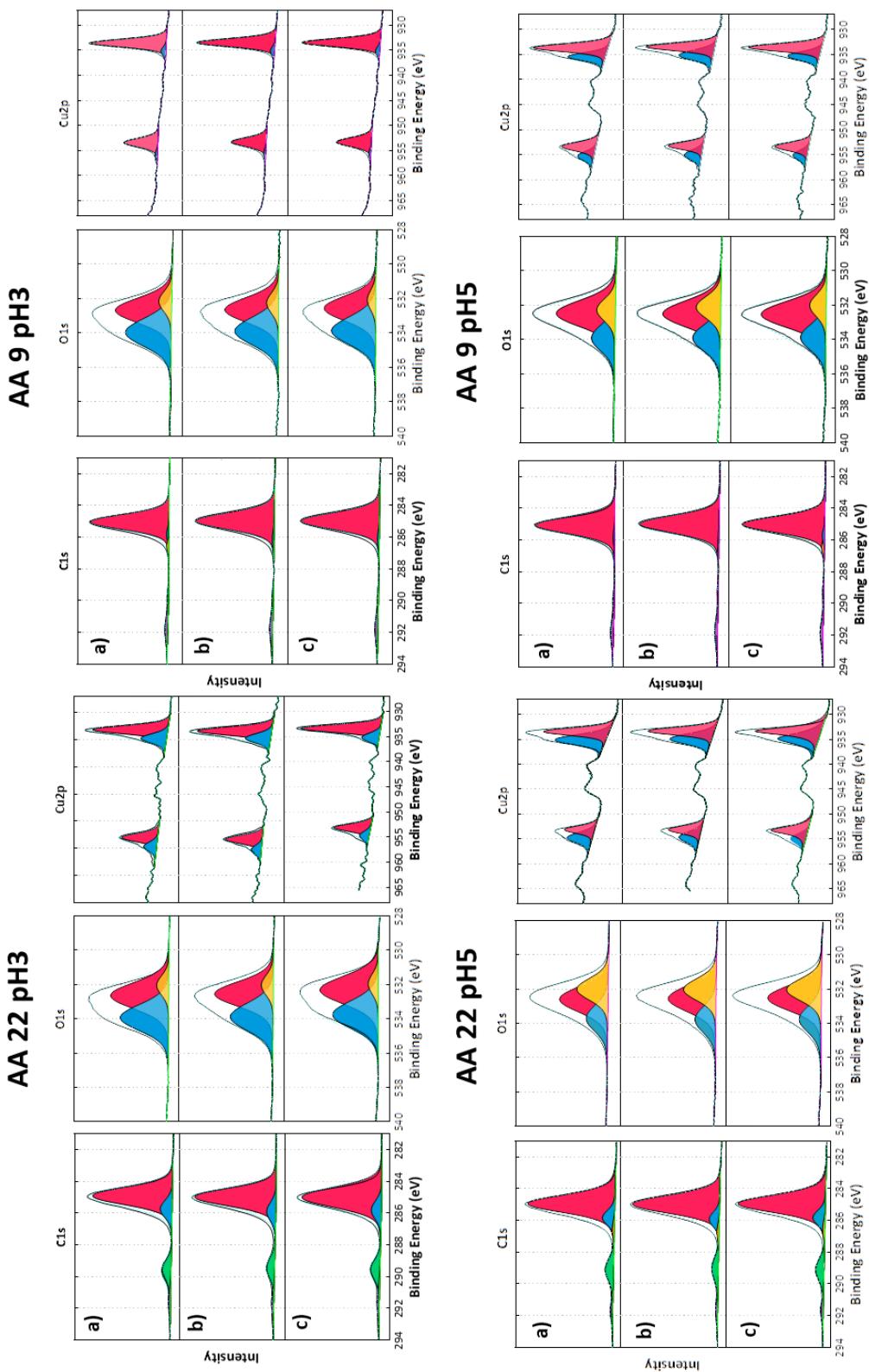


Table S2: XPS quantitative analysis of PS22 and PS9 samples exposed for 48h with copper at either pH 5 or 3.

Region	Be (eV)	FWHM (eV)	Assignment	%at. Conc			
				pH = 3		pH = 5	
				PS22	PS9	PS22	PS9
C1s	285.0	1.3	C-C / C-H	61.6	84.4	61.2	83.5
	285.8	1.3	C-CO	8.8	2.3	7.9	2.1
	289.5	1.5	COO	8.8	2.1	8.1	2.2
	291.6	1.3	π - π^*	2.4	5.9	2.1	5.9
O1s	533.5	1.8	O=C	8.9	2.3	8.6	2.4
	533.9	1.8	O-C	7.9	2.0	4.6	1.2
	532.0	1.5	O-Cu	0.9	0.5	4.	1.6
Cu2p	933.5	1.8	Cu2p _{3/2}	0.3	0.3	1.5	0.7
	935.0	2		0.1	0.02	1.0	0.3
	953.1	1.8	Cu2p _{1/2}	0.2	0.2	0.9	0.6
	954.7	2		0.1	0.02	0.8	0.3

Table S3: XPS quantitative analysis of PS22 and PS9 sample exposed for 144h with copper at either pH 5 or 3.

Region	Be (eV)	FWHM (eV)	Assignment	%at. Conc			
				pH = 3		pH = 5	
				PS22	PS9	PS22	PS9
C1s	285.0	1.3	C-C / C-H	62.8	85.7	61.2	85.2
	285.8	1.3	C-CO	8.8	1.9	8.1	1.6
	289.5	1.5	COO	8.8	2.0	8.5	2.1
	291.6	1.3	π - π^*	2.7	5.7	2.1	4.4
O1s	533.5	1.8	O=C	8.1	2.1	7.6	2.5
	533.9	1.8	O-C	6.9	1.7	6.1	1.5
	532.0	1.5	O-Cu	1.1	0.4	3.8	0.8
Cu2p	933.5	1.8	Cu2p _{3/2}	0.3	0.3	1.6	0.8
	935.0	2		0.1	0.06	0.7	0.4
	953.1	1.8	Cu2p _{1/2}	0.3	0.2	1.2	0.5
	954.7	2		0.1	0.03	0.5	0.2

Figure S5: Negative ToF-SIMS mass spectra of PS22 sample at pH 5 with a 24h copper exposition over m/z ranges (a) 0 to 100 and (b) 100 to 200.

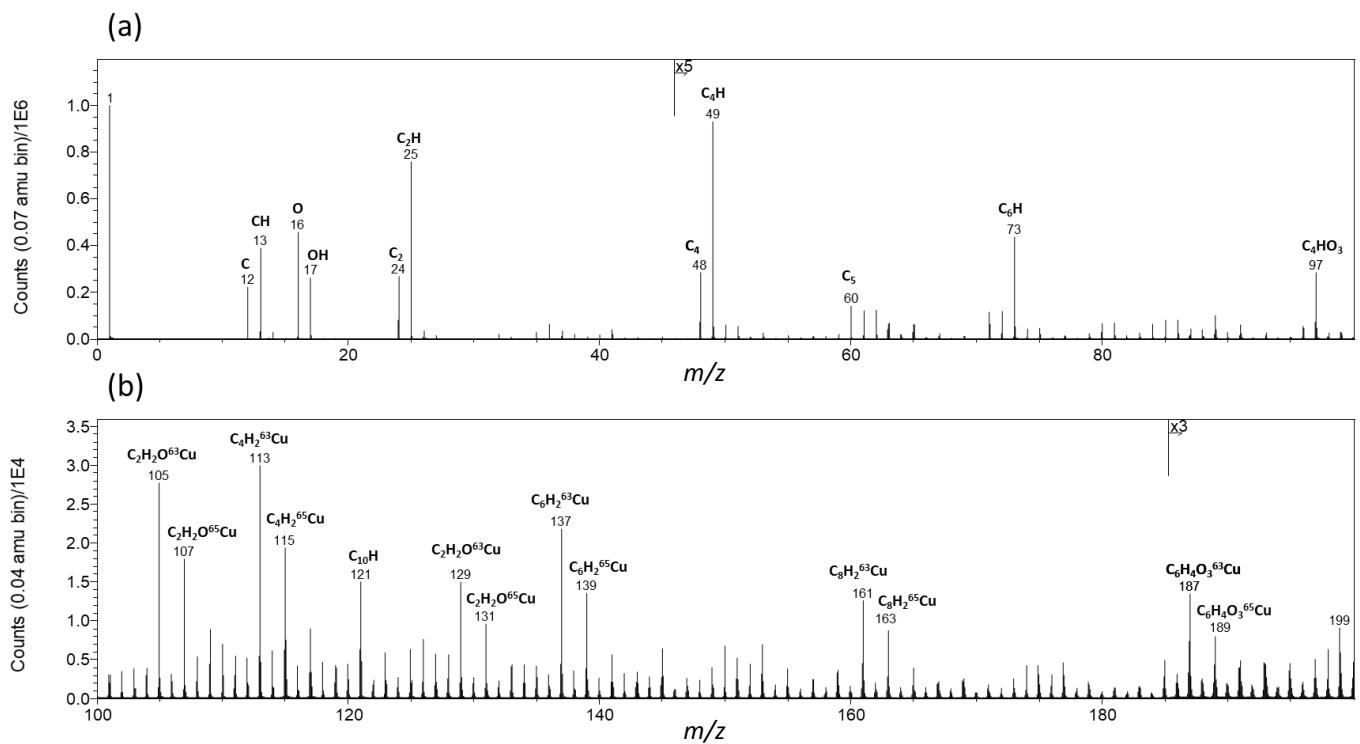


Table S4: Evolution of the surface copper concentration (% Cu 2p) and total copper concentration (Q_{sorb} in mg/g) at pH 3 and 5 for PS22 and PS9 samples.

Sample	pH	% Cu 2p ^(a)			Q_{sorb} (mg/g) ^(b)		
		Incubation Time			Incubation Time		
		24 h	48 h	144 h	24 h	48 h	144 h
PS 22	3	0.9	0.7	0.8	14.4 ± 0.1 (27%)	19.8 ± 1.3 (37%)	37.8 ± 0.7 (68%)
	5	4.6	4.2	4.0	47.1 ± 0.1 (84%)	52.5 ± 0.3 (94%)	52.8 ± 0.1 (94%)
PS 9	3	0.5	0.4	0.5	8.8 ± 0.2 (17%)	12.4 ± 0.5 (23%)	30.3 ± 1.8 (54%)
	5	2.1	1.9	2	25.1 ± 0.5 (45%)	30.5 ± 0.4 (55%)	46.4 ± 0.2 (84%)

Determined by XPS ^(a) and ICPMS ^(b).

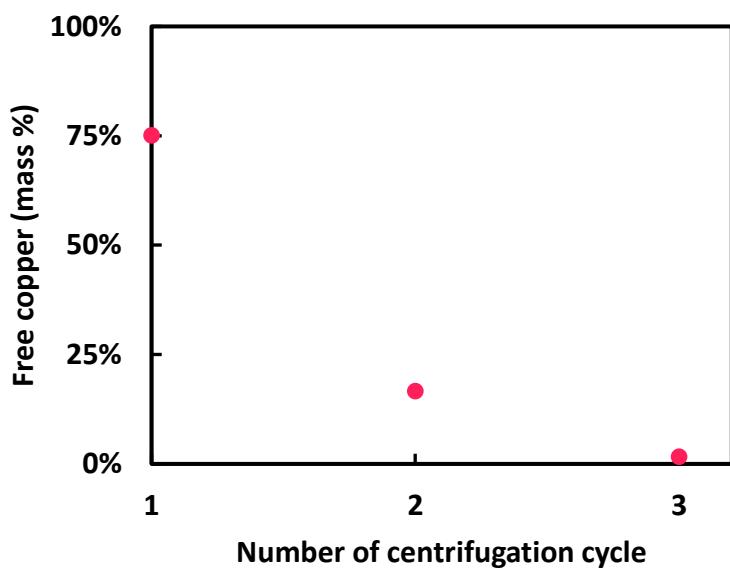


Figure S6: Evolution of the mass percentage of the free copper in the supernatant after each centrifugation cycle (15K RPM, 30 min) measured by ICPMS.