Supporting Information for

Size, composition, morphology and health implications of airborne incidental metal-containing nanoparticles

Key Words: Incidental nanoparticles, respiratory deposition curve, single particle analysis, fractal-like agglomerates, NP-collectors.

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Supporting Information. The SI contains the following information:

Table S1. Size separation is done using a nano-MOUDI cascade impactor and corresponding stages.

Table S2. LOQs and LODs of Al, Mn, Fe, Cu and Zn in nano-MOUDI substrates.

Figure S1. Comparison of the Fe (left) Mn, (middle) and Cu (right) concentrations between on-site and off-site nano-MOUDI measurements at the machining center during Day 2 (a) and Day 3 (b).

Figure S2. Comparison of the Fe (left) Mn, (middle) and Cu (right) concentrations between on-site and off-site nano-MOUDI measurements at the foundry during Day 1 (a) and Day 3 (b).

Figure S3. Composition of incidental particles observed at the machining center and the foundry. Percentage of the main metals found in the elemental analysis of the digested nano-MOUDI filters are summarized for samples collected during days 1, 2 and 3 for the machining center (a) and foundry (b). No data are shown if metals were present in concentrations lower than the corresponding LOD.

Figure S4. Low magnification SEM images of particles found at the machining center and the foundry for different size ranges including for particles collected by the nano-MOUDI stages 3 (3.2-5.6μm), 5 (1-1.8μm), 7 (320-560nm) and 9 (100-180nm) at the machining center (a) and the foundry (b).

Figure S5. SEM-EDS of particles found on the machining center and the foundry. The SEM image is compared to the Fe, O, Mn, and Cu elemental mappings for both sites in nano-MOUDI stage 7 (320-560nm). Zn, and Mg were also found and mapped in the foundry.

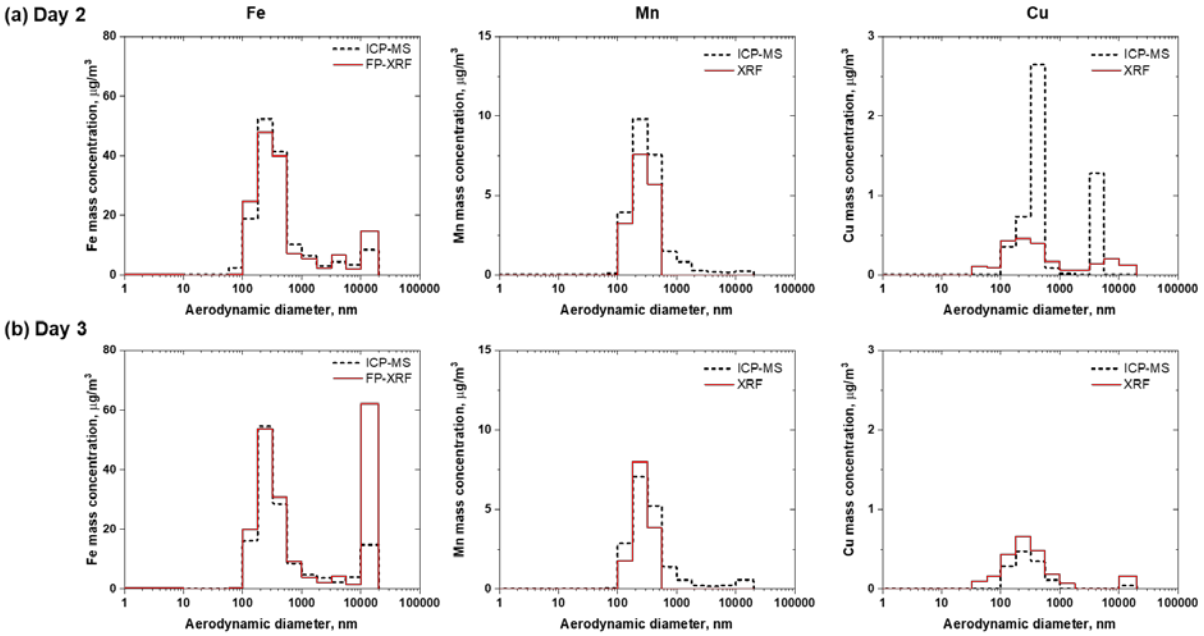
Table SI. Size separation is done using a nano-MOUDI cascade impactor and corresponding stages.

Stage	d_{50}, nm	Midpoint diameter (d_i), nm	Substrate material
1	10000	15000	Polycarbonate
2	5600	7800	Polycarbonate
3	3200	4400	Polycarbonate
4	1800	2500	Polycarbonate
5	1000	1400	Polycarbonate
6	560	780	Polycarbonate
7	320	440	Polycarbonate
8	180	250	Polycarbonate
9	100	140	Polycarbonate
10	59	79.5	Polycarbonate
11	32	45.5	Polycarbonate
12	18	25	Polycarbonate
13	10	14	Polycarbonate
14 Final filter	<10	6	Mixed cellulose ester (MCE)

Table SII. LOQs and LODs of Al, Mn, Fe, Cu and Zn in nano-MOUDI substrates.

Technique	Substrate	Al		Mn		Fe		Cu		Zn	
		LOQ (µg)	LOD (µg)	LOQ (µg)	LOD (µg)	LOQ (µg)	LOD (µg)	LOQ (µg)	LOD (µg)	LOQ (µg)	LOD (µg)
ICP-MS	PCTE	0.801	0.473	0.071	0.054	1.849	1.335	0.039	0.012	1.703	1.429
	MCE	0.730	0.333	0.071	0.057	0.417	0.125	0.031	0.009	0.782	0.621
FP-XRF	PCTE	N. M.	N. M.	N. D.	0.94*	N. D.	0.93*	4.52	3.38	N. D.	0.40*
	MCE	N. M.	N. M.	N. D.	1.61*	10.47	4.82	N. D.	1.61*	N. D.	1.61*

N. M. = Not measured, N. D. = Not detected, *= Based on the LOD from the instrument.



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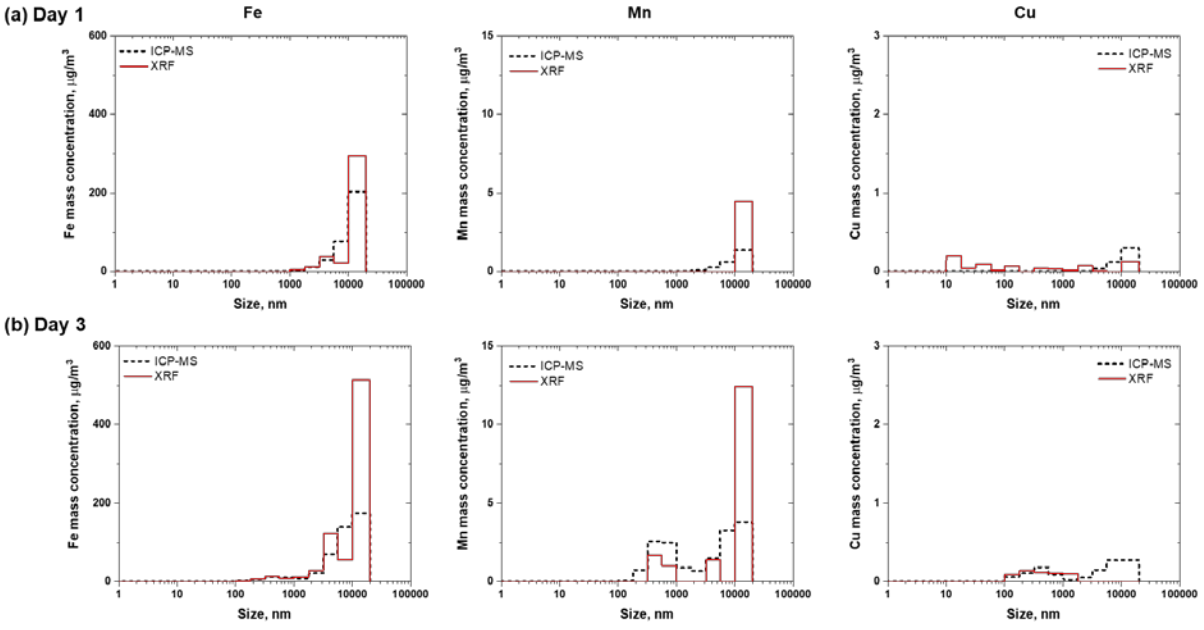

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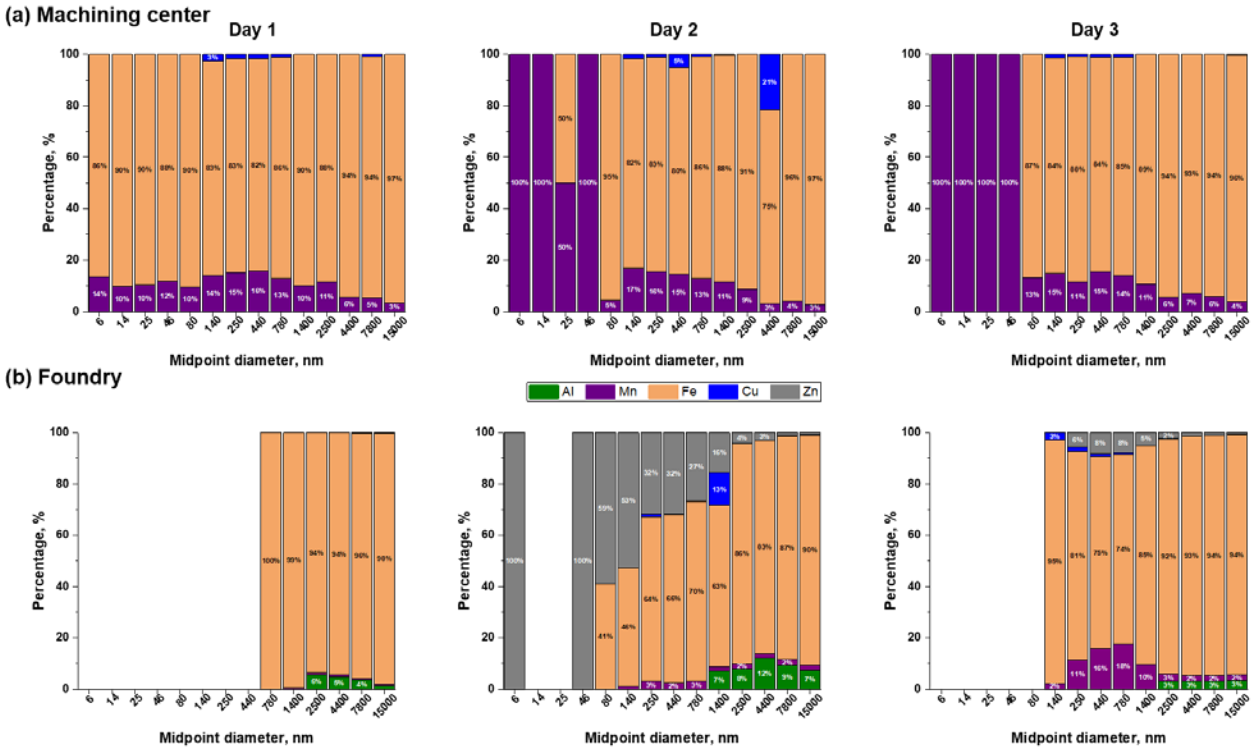

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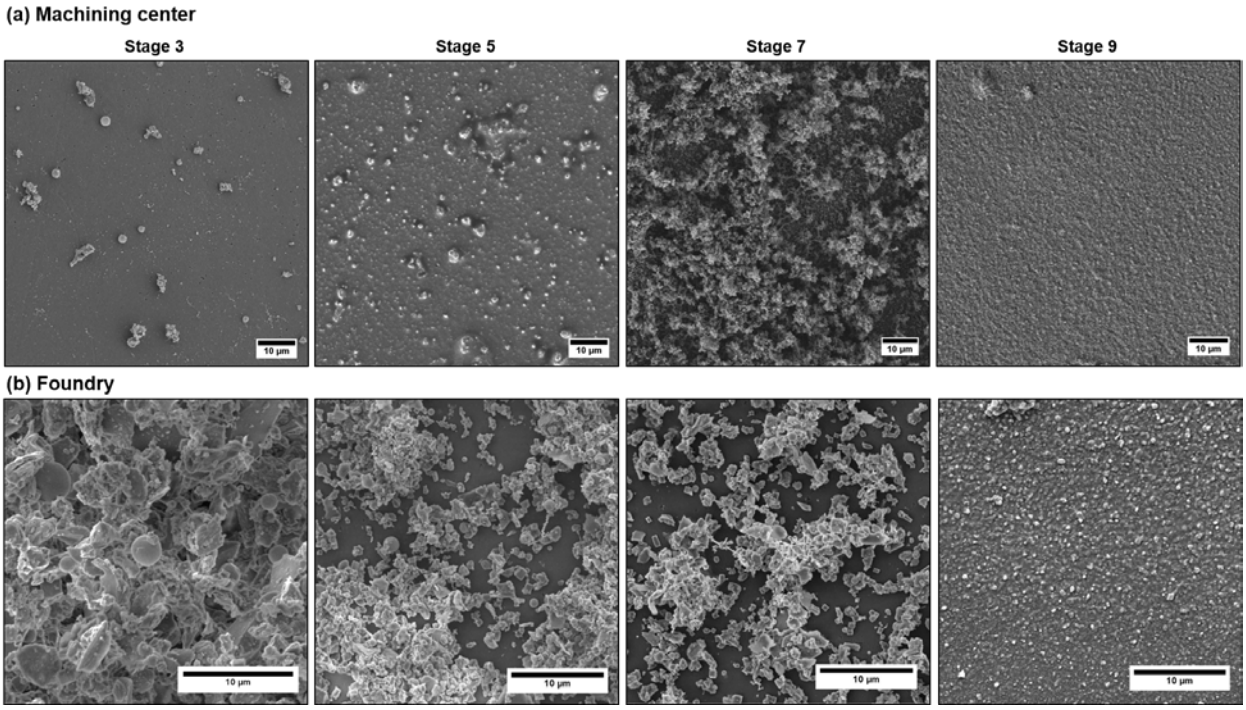

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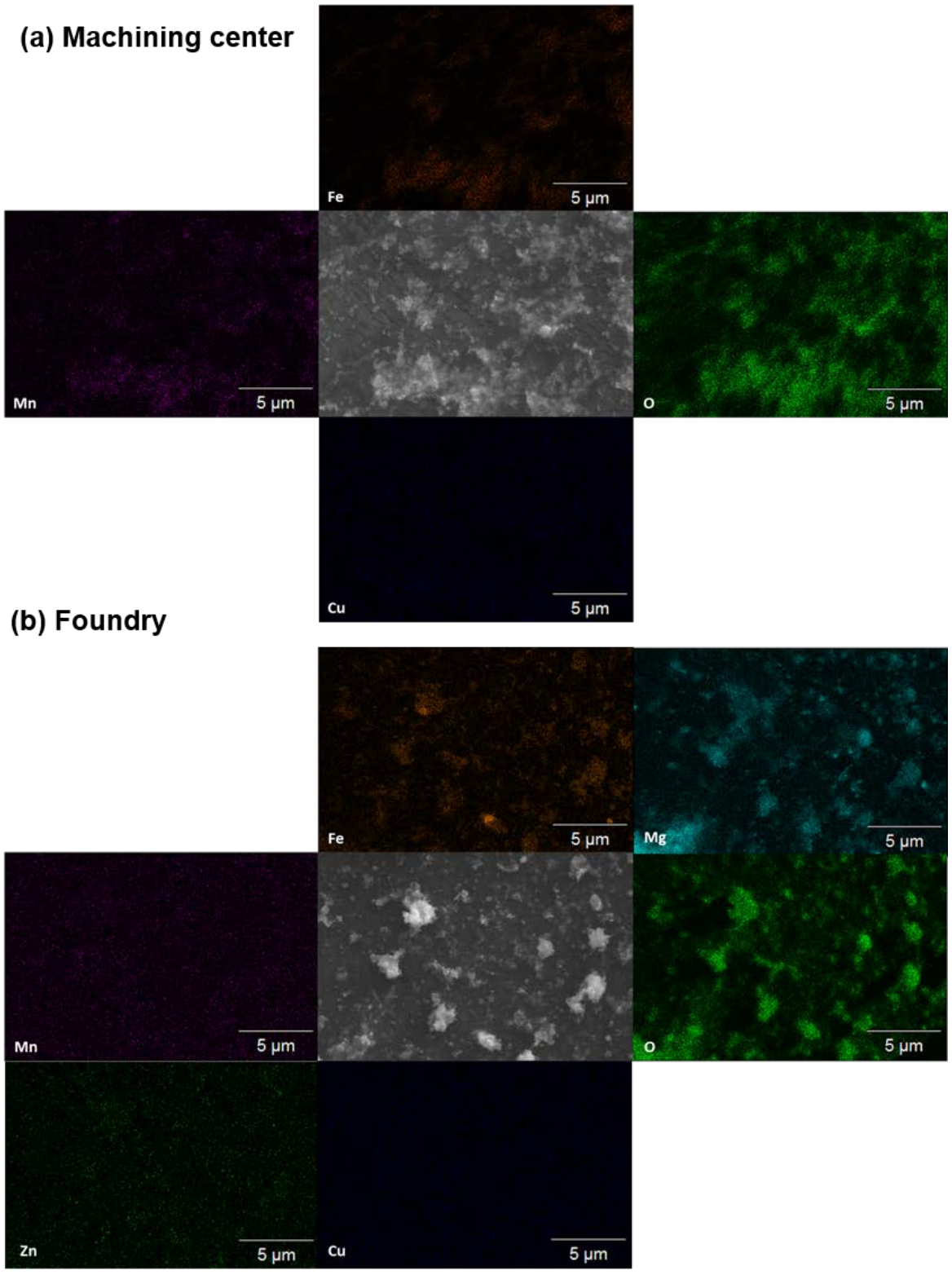

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