

# *Electronic supplement to:* Particle characterisation and bioaccessibility of manganese in particulate matter in silico- and ferromanganese smelters

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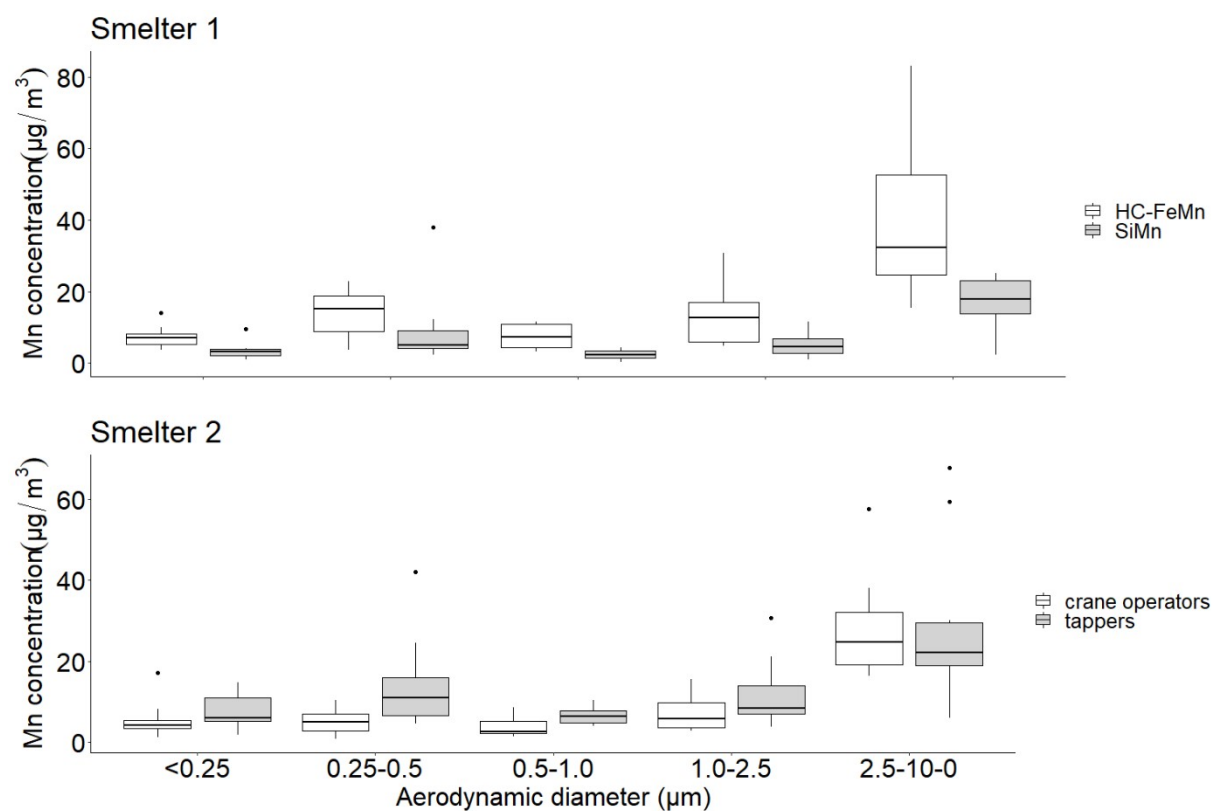
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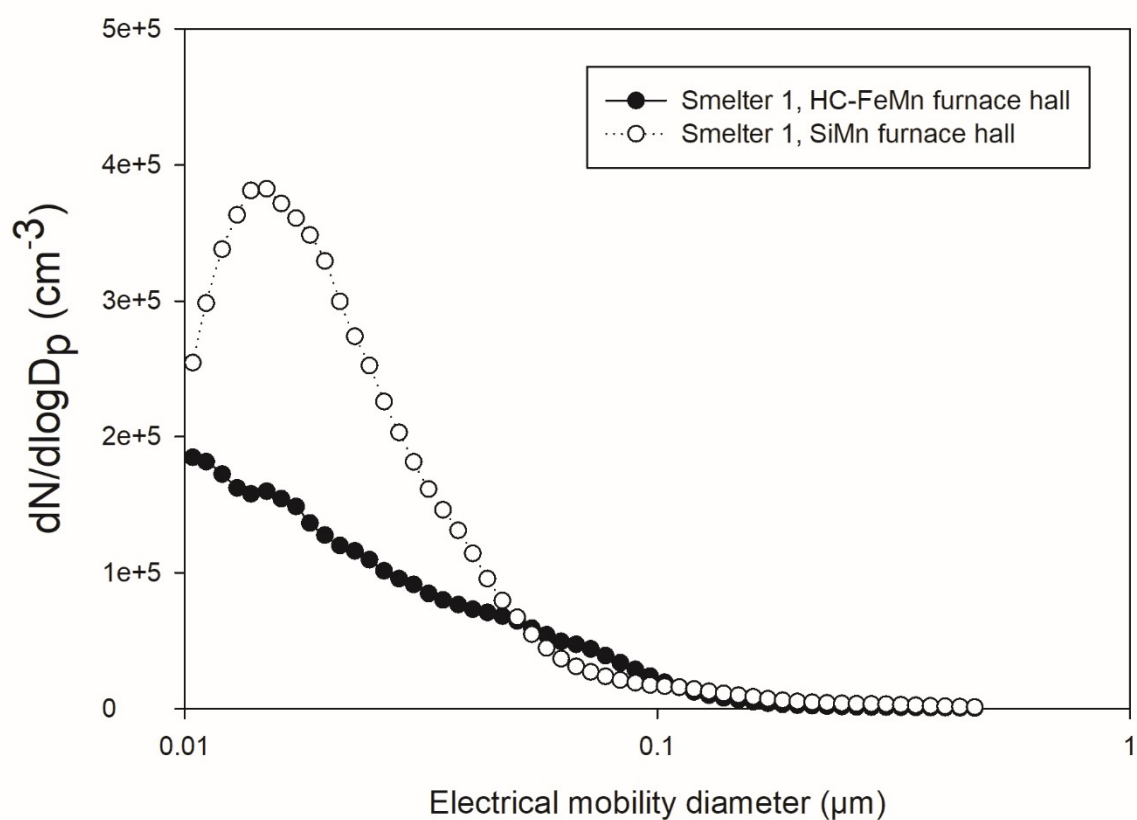
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**S-Table 1:** ICP-MS operating conditions

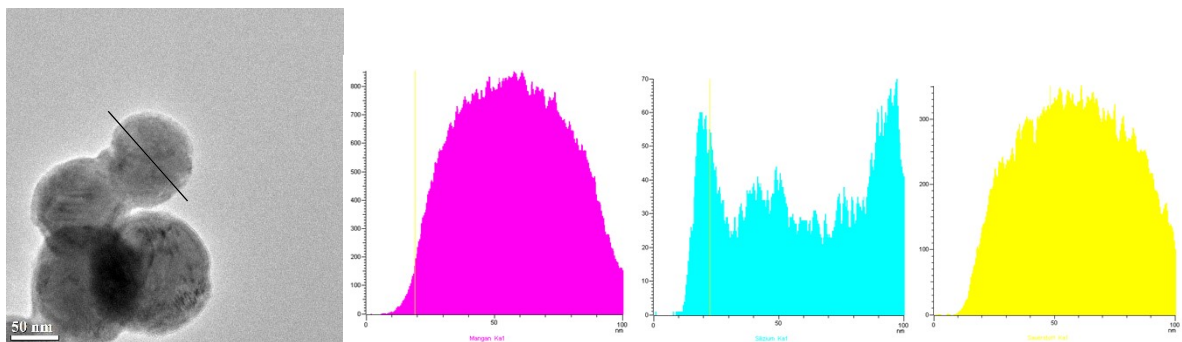
	Gamble's matrix	Acid matrix
<b>Sample introduction system</b>	ISIS Discrete Sampling	
<b>Tune mode</b>	[O <sub>2</sub> ]	
<b>Scan type</b>	MS/MS	
<b>RF Power</b>	1550 W	
<b>Sampling depth</b>	10 mm	
<b>Carrier gas (As) flow rate</b>	1.05 L/min	
<b>Gas flow rate (optional gas)</b>	O <sub>2</sub> – 40 %	
<b>Sampling cone</b>	Platinum	
<b>Skimmer cone</b>	Platinum	
<b>Nebulizer type</b>	MicroMist	
<b>Spray chamber type</b>	Quartz, double pass	Teflon
<b>Detector mode</b>	P/A	
<b>Selected isotopes (Q1-Q3)</b>	<sup>55-71</sup> Mn	
<b>Internal standard</b>	<sup>72-72</sup> Ge, <sup>72-88</sup> Ge	



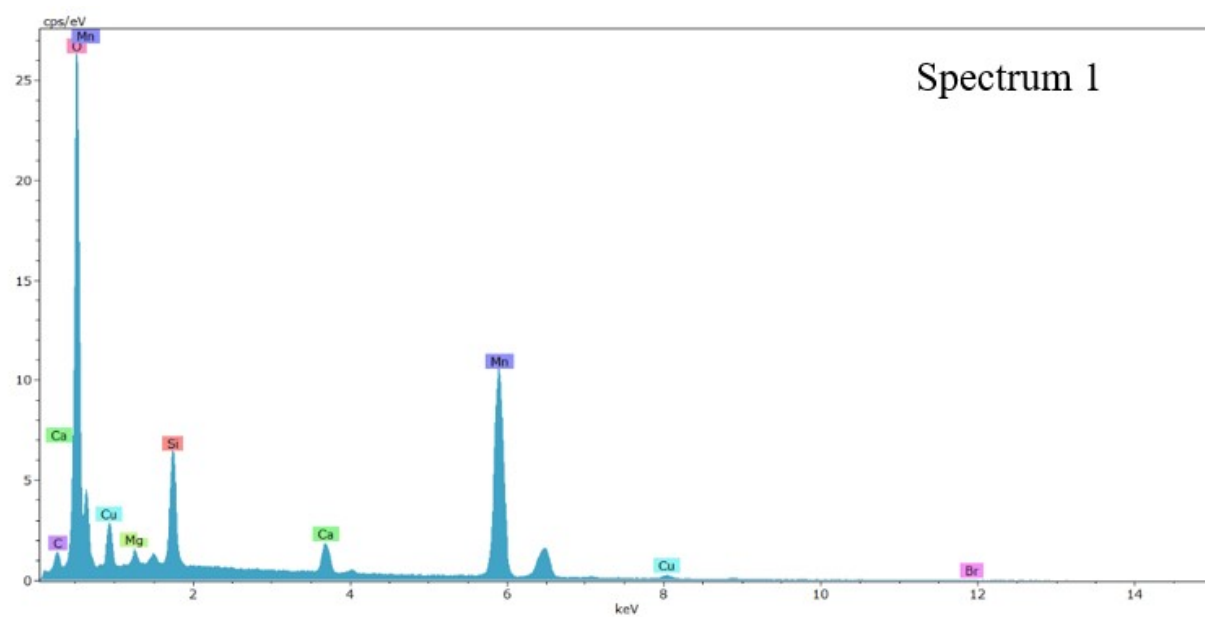
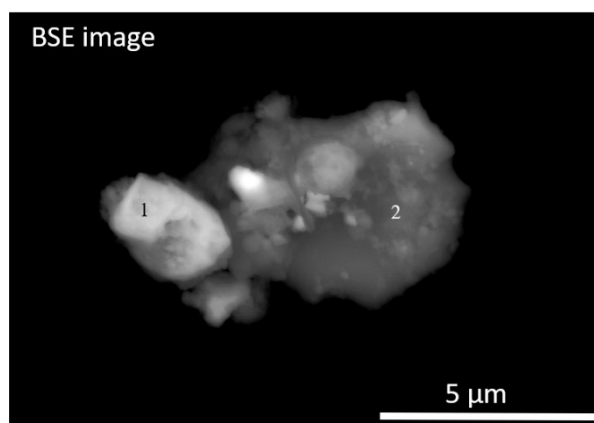
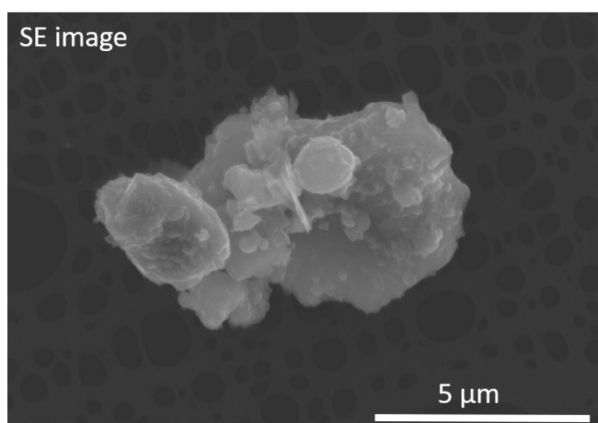
**S-Figure 1:** Total concentrations of Mn in particulate matter as function of particle size. Samples were collected with a 5-stage cascade impactor attached to the breathing zone of tapper and crane operators working in the SiMn or HC-FeMn production in Smelter 1 (top) or HC-FeMn production workers in smelter 2 (bottom).

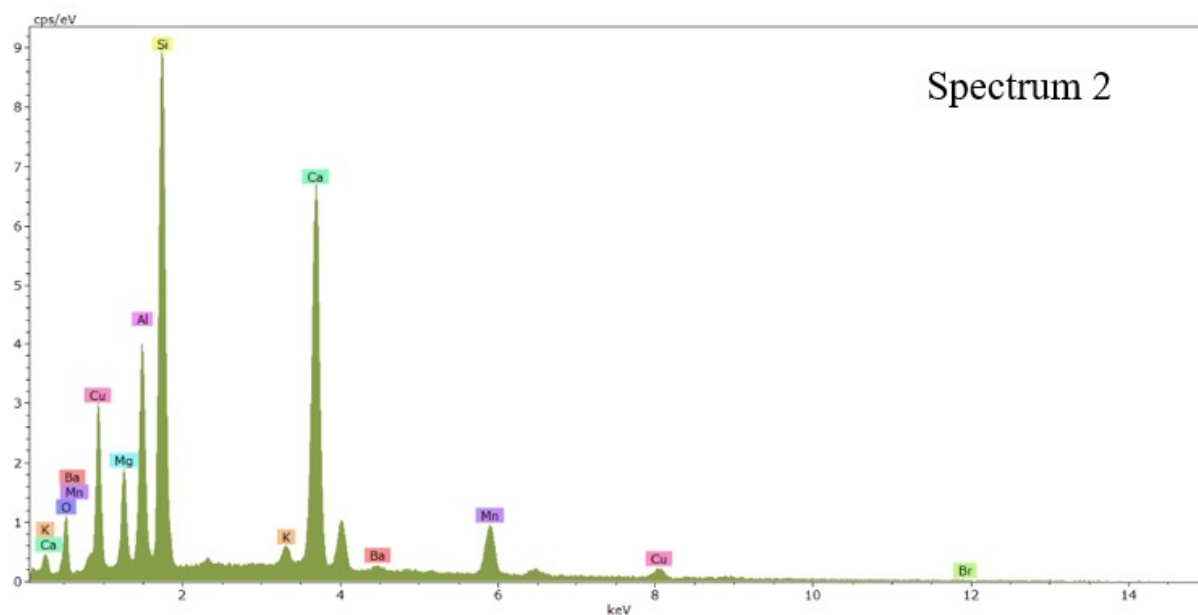


**S-Figure 2:** The average number size distributions from SMPS measurements in Smelter 1.

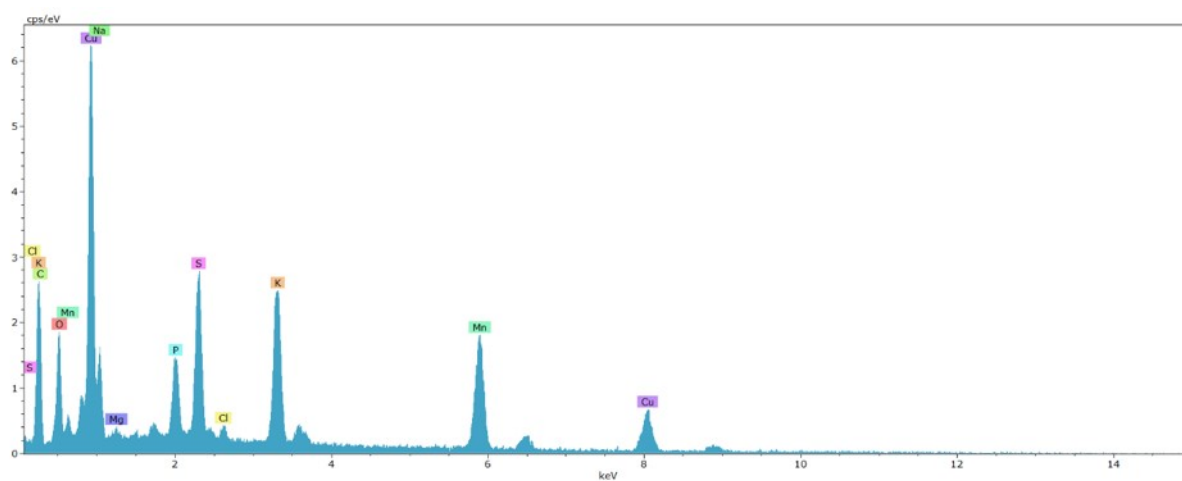
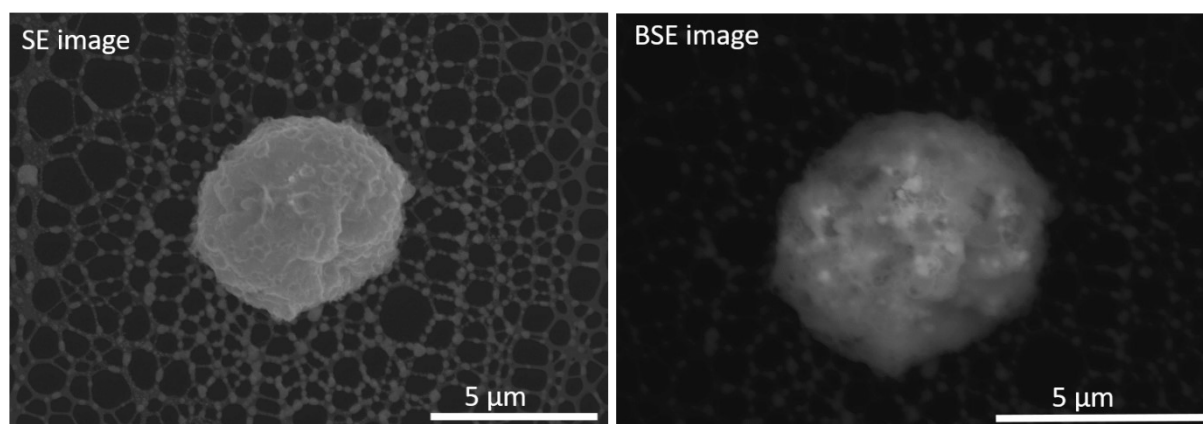


**S-Figure 3:** STEM-EDX elemental line scan (marked on TEM image) of Mn (pink), Si (blue) and O (yellow).

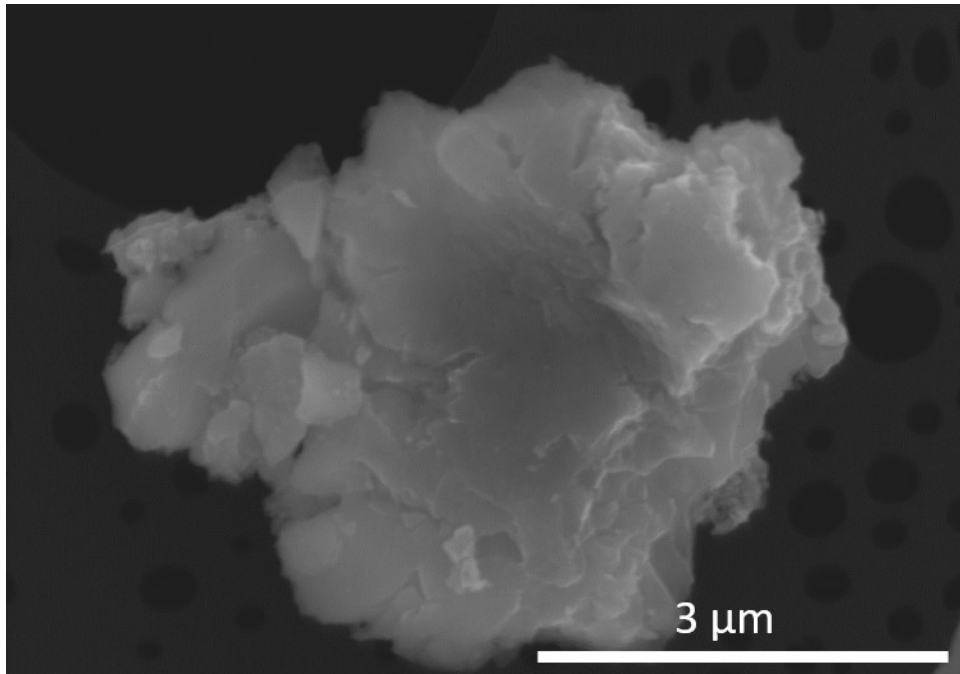




**S-Figure 4:** Secondary electron (SE) and backscattered electron (BSE) images (upper left and upper right) of a mixed particle consisting of a Mn-O rich region and region containing the typical slag components in SiMn production. Spectrum 1 and 2 shown below are from the bright and dark regions in the BSE image, denoted 1 and 2.



**S-Figure 5:** Secondary electron (SE) and backscattered electron (BSE) images (upper left and upper right) of a K, Na, Cl rich particle collected on the nanoMOUDI cascade impactor stage 2 ( $d_{ae}$  cut off 5.6  $\mu\text{m}$ ). Bright spots in the BSE image are identified as Mn rich regions. A spectrum obtained from the particle is shown below.



**S-Figure 6:** A particle rich in Mn-Si-Ca-Al-Mg-O, which are all slag components in the HC-FeMn production.