

Electronic Supplementary Information (ESI)



Fig S1 Influence of the pixel size on the image quality as simulated by virtual LA-ICP-MS mapping of the Lenna image (the original has a pixel size of 1 μm).

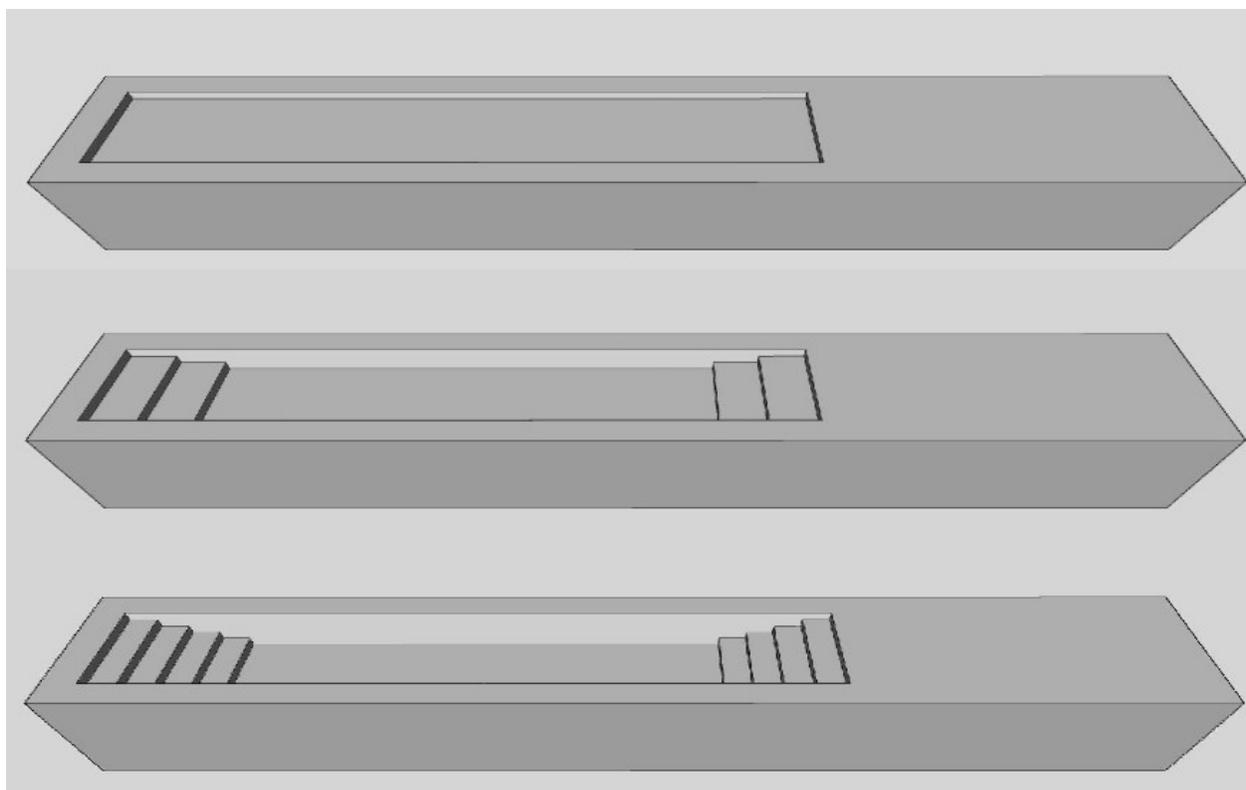


Fig S2 Pulsed LA line scans on a surface, with one ($n=1$), three ($n=3$) or five ($n=5$) shots per “square” pixel; for better visualization the ablation depth is starkly exaggerated (in general ca. 150 nm of material is remove per pulse, whereas the dimensions of the beam size are usually in the 5-20 μm range for bioimaging).



Fig S3 Influence of laser sampling, i.e. the number of oversampled pixels (n), on the image quality as simulated by virtual LA-ICP-MS mapping of the Lenna image via step 1 and 4 of the simulation protocol in Fig. 1.

$n=1$



$n=10$



Fig S4 Influence of scanning speed (SS) / acquisition time (AT), in combination with the system's response time $FW0.01M$ of 0.1 s, on the image quality; both single pulse ($n=1$) and multiple pulse ($n=10$) analysis are simulated by virtual LA-ICP-MS mapping of the Lenna image according to steps 1, 3 and 4 of the simulation protocol in Fig. 1.



Fig S5 Influence of the average single element concentration C (mg kg^{-1}) on the image quality; both single pulse ($n=1$) and multiple pulse ($n=5$ and $n=10$) analysis are simulated by virtual LA-ICP-MS mapping of the Lenna image according to steps 1-5 of the simulation protocol in Fig. 1. Response time, $FW0.01M=0.1$ s; proportionality factor, $q=0.05$; sensitivity, $S=1$ count μg^{-1} $\text{g } \mu\text{m}^{-2}$ per pulse; beam size, $BS=5$ μm (square mask).

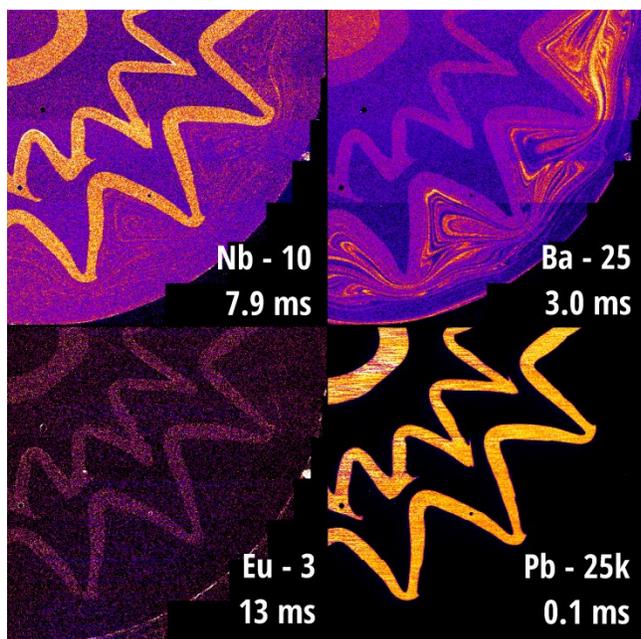


Fig S6 Multielemental LA-ICP-QMS mapping of one quadrant of the murrina glass (four elements) in one run in oversampling mode ($n=10$); mapping conditions: $FW0.01M$, 12.5 ms; beam size, 5 μm (square mask); repetition rate, 300 Hz; scanning speed, 150 $\mu\text{m s}^{-1}$; acquisition time, 33.3 ms; dwell times, see inserts in image.