

Supplementary material

Supp Fig 1: Elemental distributions of Ca, K, Fe, Zn and Compton scattering obtained on NIST SRM 611 (trace elements in glass, 500 ppm), NIST SRM 613 (trace elements in glass, 50 ppm), NIST SRM 1577C (bovine liver pellet). All the standard reference materials were measured for 15 min using a pinhole and an excitation energy of 10 keV.

Supp Movie 1: calcium FF-XRF images of a single foraminifer (45 projections between 0-180 degrees). All projections were measured for 10 minutes, using the 6:1 magnifying polycapillary optic, at an excitation energy of 17 keV.

Supp Movie 2: iron FF-XRF images of a single foraminifer (45 projections between 0-180 degrees). All projections were measured for 10 minutes, using the 6:1 magnifying polycapillary optic, at an excitation energy of 17 keV.

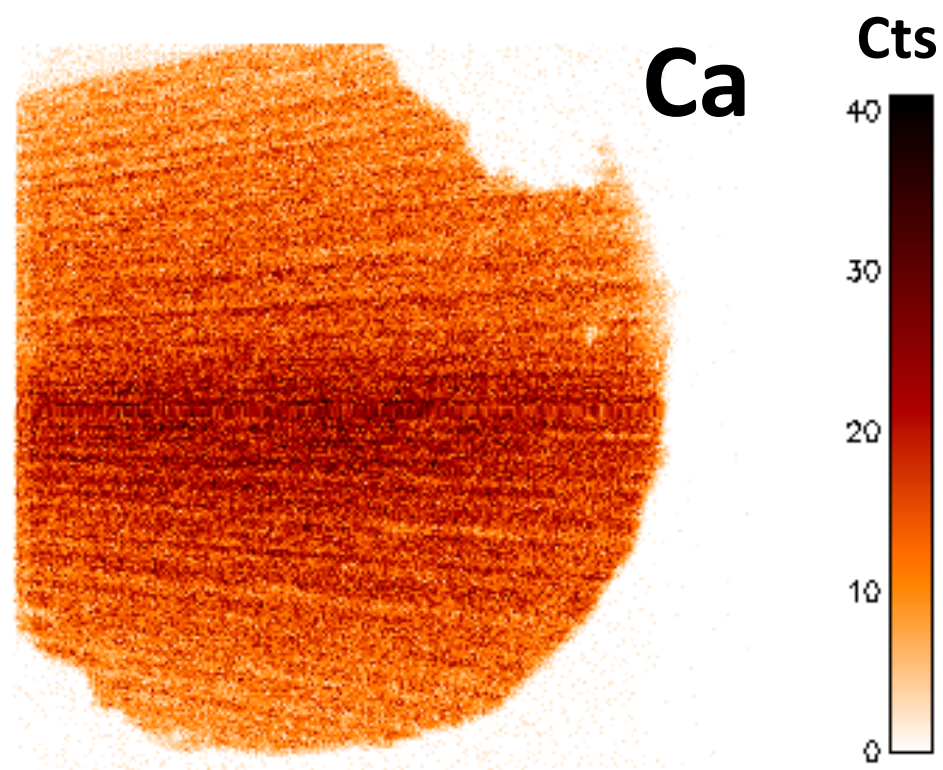
Supp Movie 3: FF-XRF images of the elements calcium (red), iron (green) and strontium (blue) of a single foraminifer (45 projections between 0-180 degrees). All projections were measured for 10 minutes, using the 6:1 magnifying polycapillary optic, at an excitation energy of 17 keV

Supp Movie 4: Left: FF-XRF sinograms of the elements calcium (red) and iron (green) of a single foraminifer (264 sinograms), derived from Supp Movie 3. Right: Reconstructed cross section of the elements calcium (red) and iron (green) using conventional backprojection method.

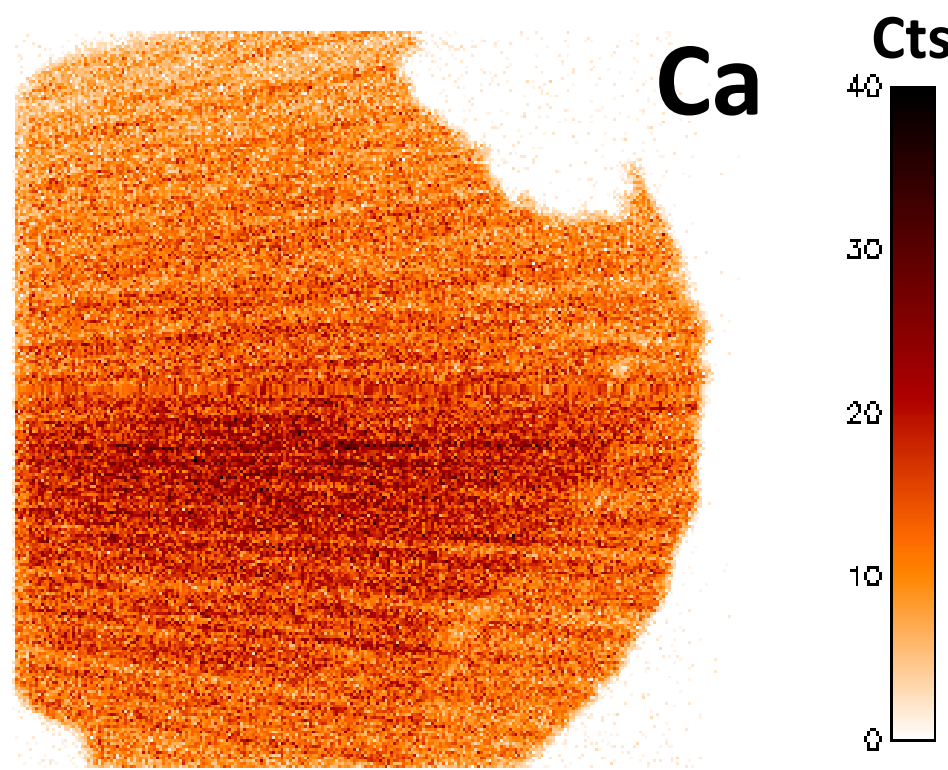
Supp Movie 5: absorption microtomography of the same foraminifer shown in Supp Movie 1-4 using a high resolution PCO™ camera (projections acquired between 0 and 180 degrees).

Supp Movie 6: 2D (projection) FF-XRF images of the elements calcium (red), iron (green) and zinc (blue) of *Daphnia magna* (40 projections between 0-180 degrees). All projections were measured for 400 s, using a pinhole optic, at an excitation energy of 10 keV.

NIST SRM 611



NIST SRM 613



NIST SRM 1577

