Figure S1: Grains mounted for µXRF/µXANES measurements. Grains are attached with carbon tape to avoid movement.
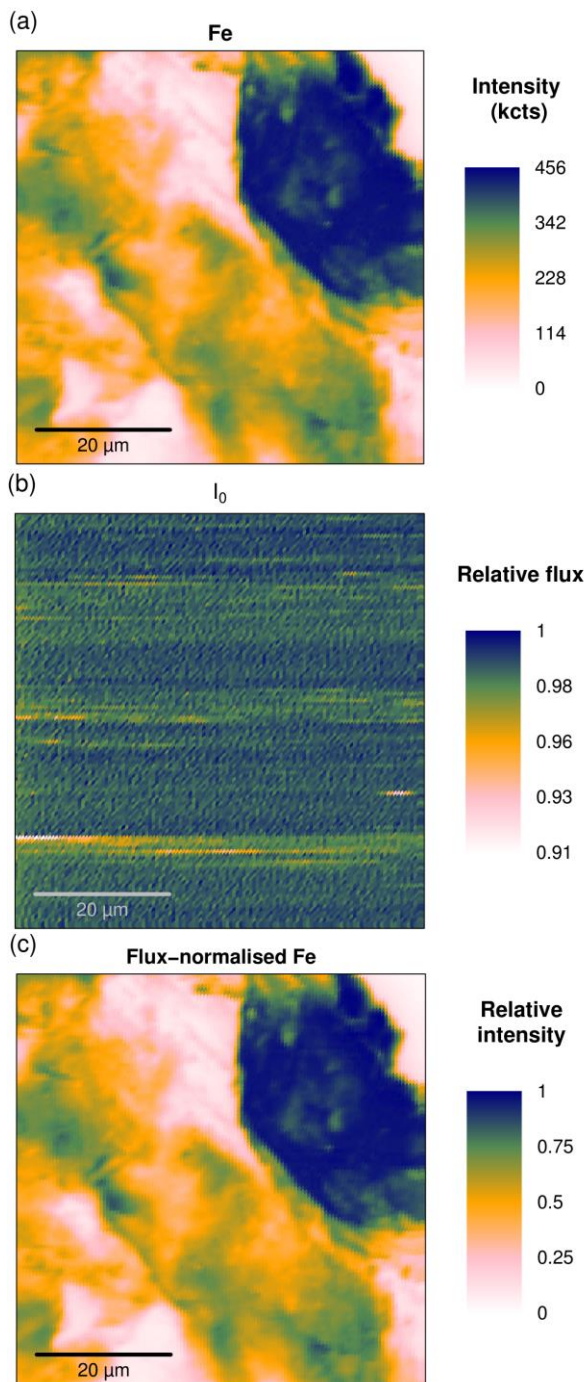
Figure S2: Workflow of the X-ray flux (I_0) normalisation, taking the Fe map of grain #17 (sample X7368) as an example. The (a) raw counts obtained by fitting the XRF spectra are divided by (b) I_0 to yield (c) a normalised map corrected for flux fluctuations.
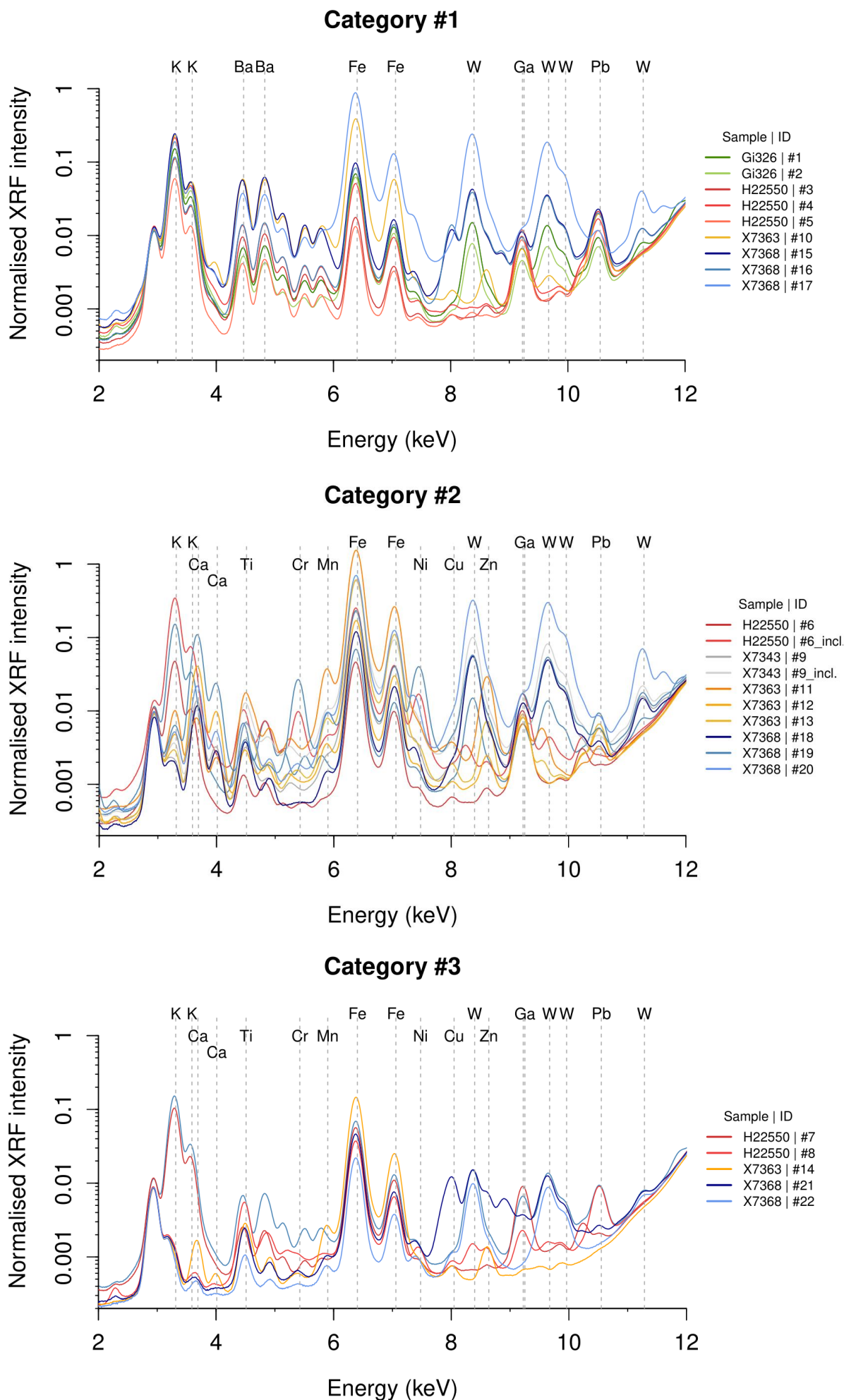
Figure S3: µXRF spectra of all grains, separated by IR-RF signal categories. The spectra are normalised to the Compton energy peaks. The characteristic energies of the strongest emissions of the main identified elements are shown as dashed lines.