ARTICLE

Supporting information

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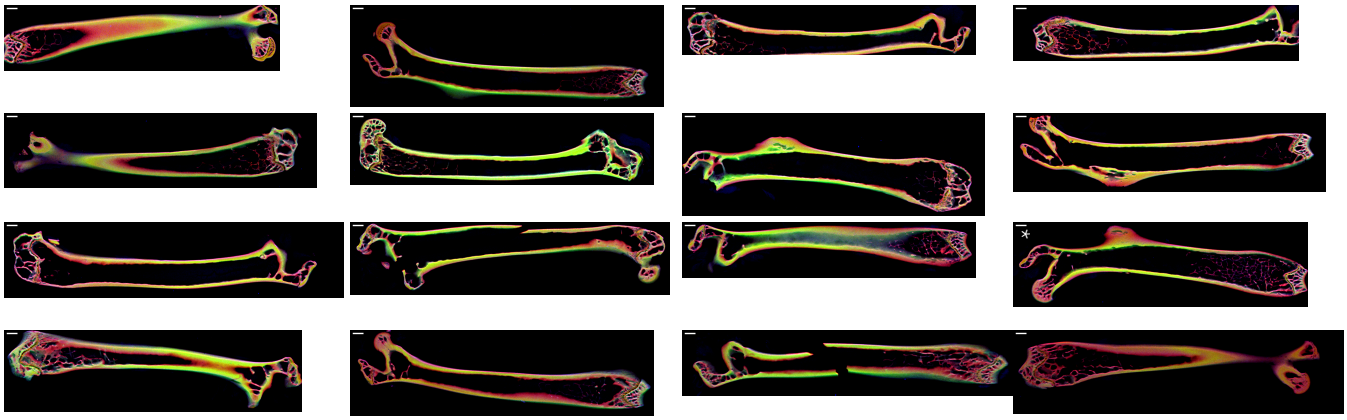

Figure S1: XRF maps of all samples. Red: Ca, Green: Sr, Blue: Zn. Scale bar is 600 µm. sample marked with a * is shown in the main article.

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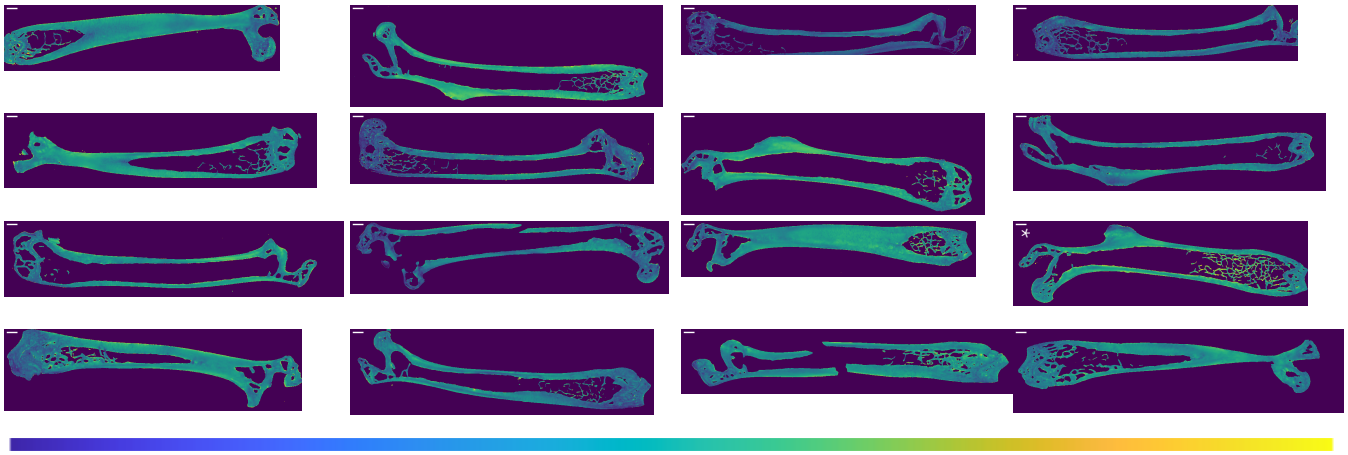

Figure S2: Unit cell *c* axis. Scale bars are 600 µm. Colour bar from 6.65 to 8.95 Å. Sample marked with * is shown in the main article.

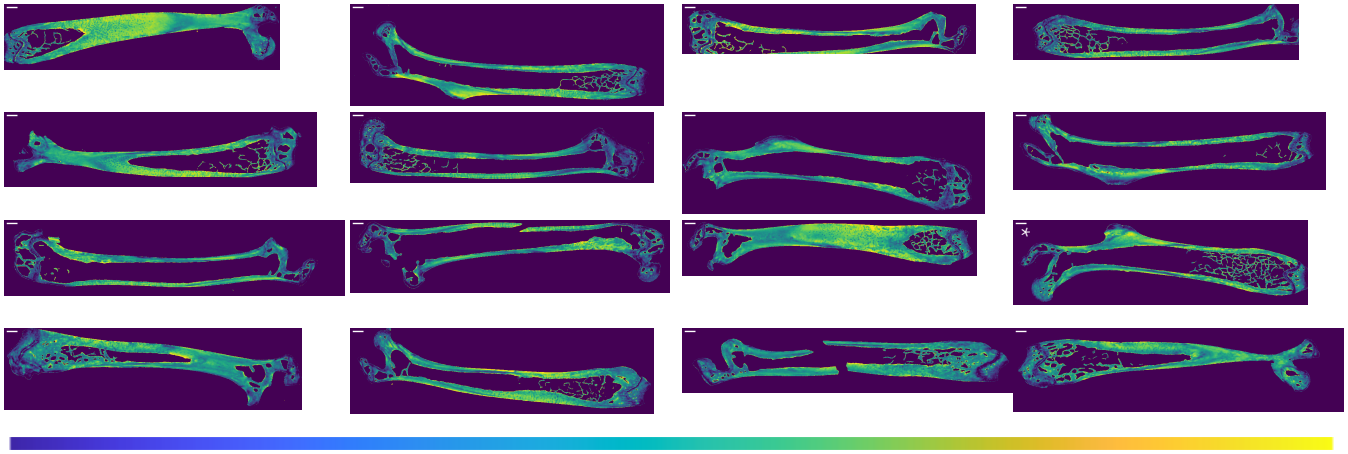

Figure S3: Apparent crystallite size in the <002> direction. Colour bar from 20 to 28 nm. Sample marked with * shown in the main article. Scale bars are 600 µm.

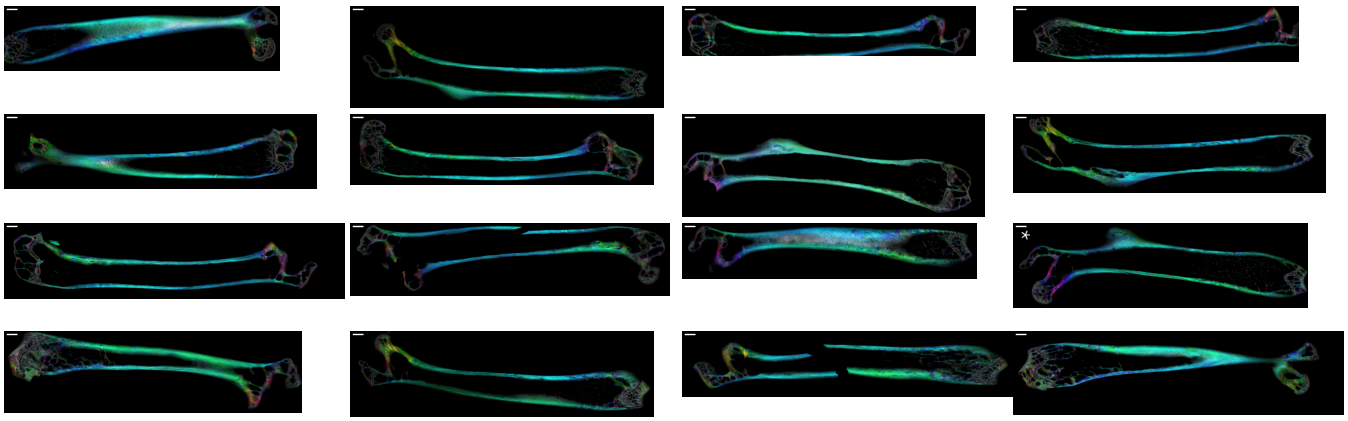

Figure S4: Orientation maps for all bones used in the study. Hue: direction, Saturation: Degree of Orientation, Value: Total 002 signal. Scale bars are 600 µm. Sample marked with * is shown in the main article

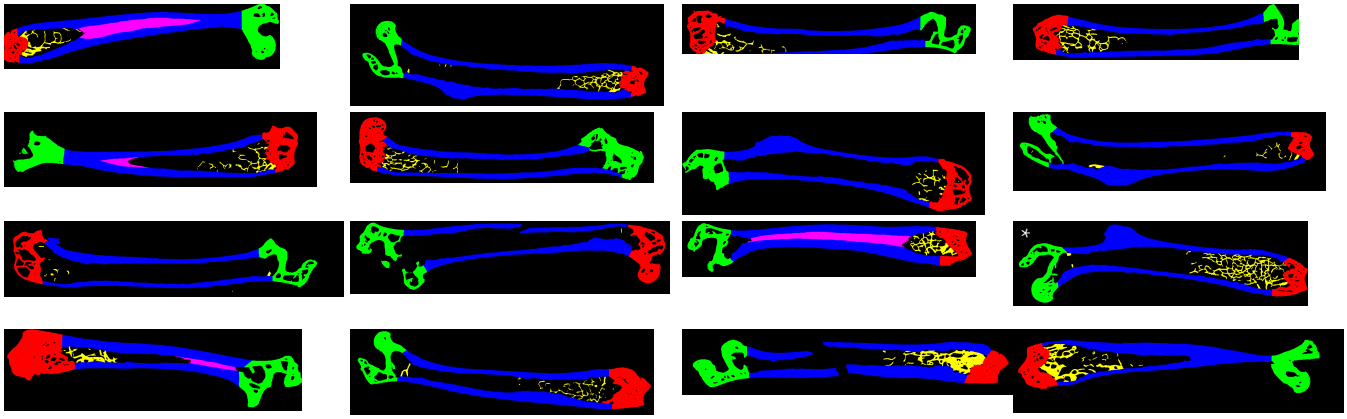

Figure S5: Segmentation maps for all samples used in the study. Blue: Cortical, Green: Femoral head, Red: Condyle, Yellow: trabeculae, Magenta: Central cortex, the different orientation this is scanned from means that another crystallite population is probed, hence it is removed from the statistical analysis. Sample marked with * is shown in main article.