Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information: Structure and composition of various fossilized bone and teeth samples with special emphasis on the fluorine content by A. Luebke et al.

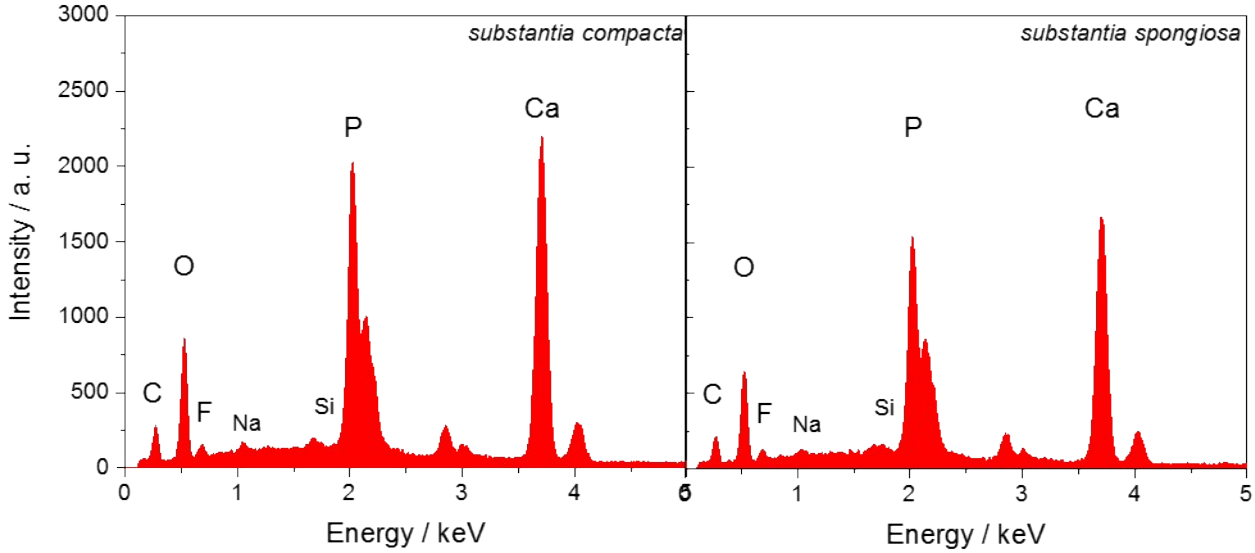

Fig. S1: EDX spectra of sauropod dinosaur bone (sample 4 according to table 1 and figure 1).

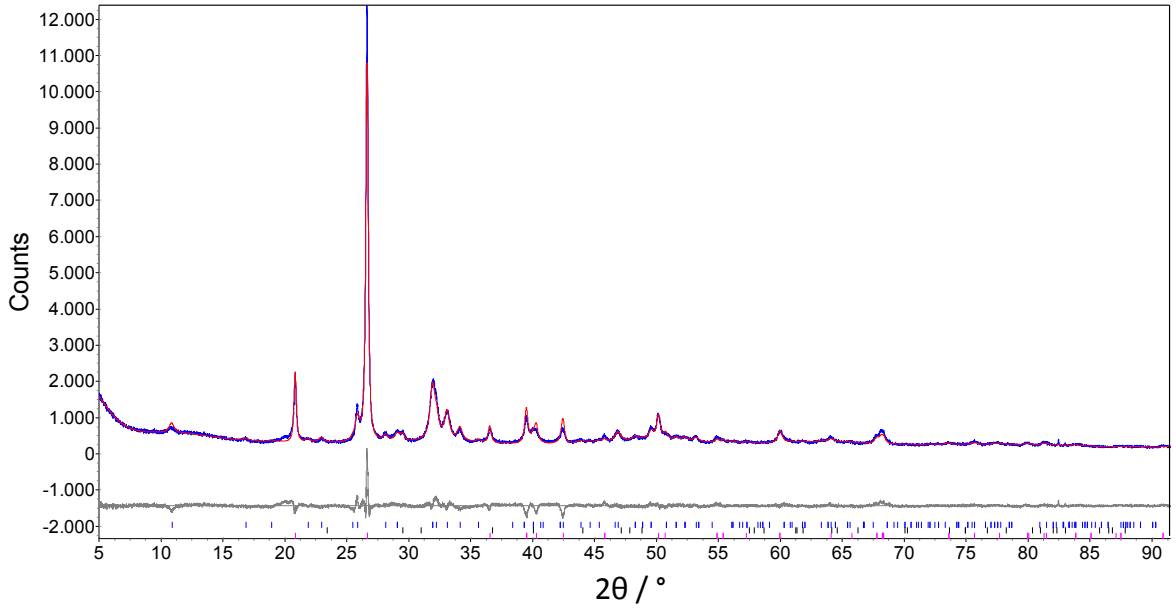

Fig. S2: Rietveld refinement of powder X-ray diffraction measurement of the sauropod dinosaur bone *substantia spongiosa* (sample 4 according to table 1 and figure 1).

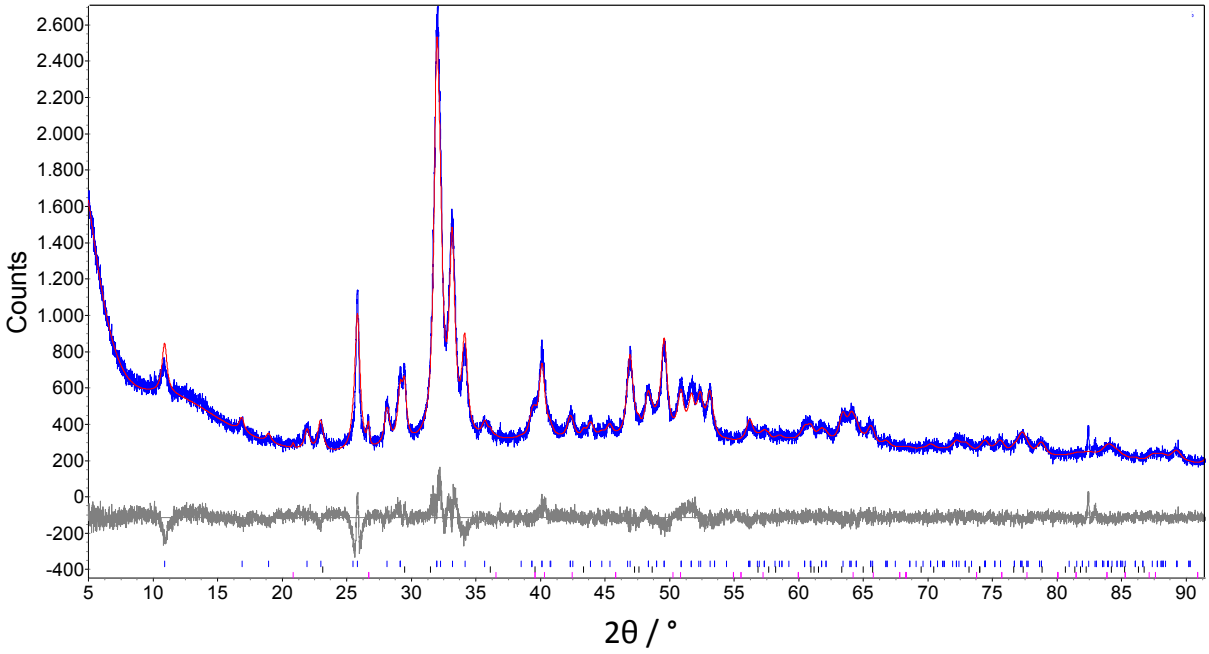

Fig. S3: Rietveld refinement of powder X-ray diffraction measurement of the sauropod dinosaur bone *substantia compacta* (sample 4 according to table 1 and figure 1).

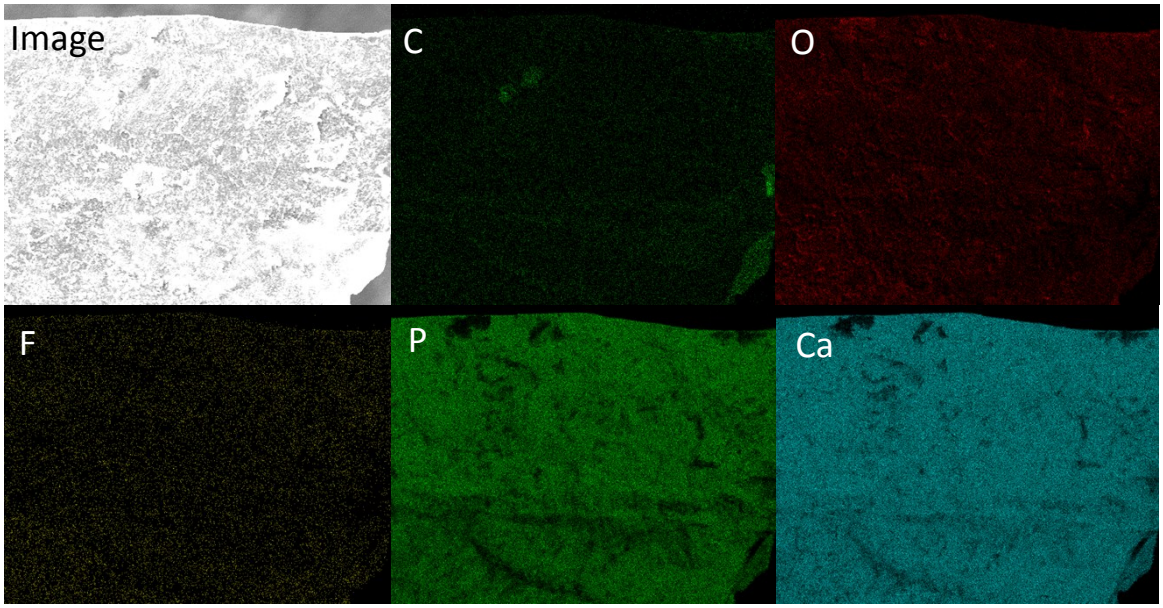

Fig. S4: EDX mapping of the surface of a fractured raolid mammal tooth fragment (sample 9 according to table 1 and figure 1).

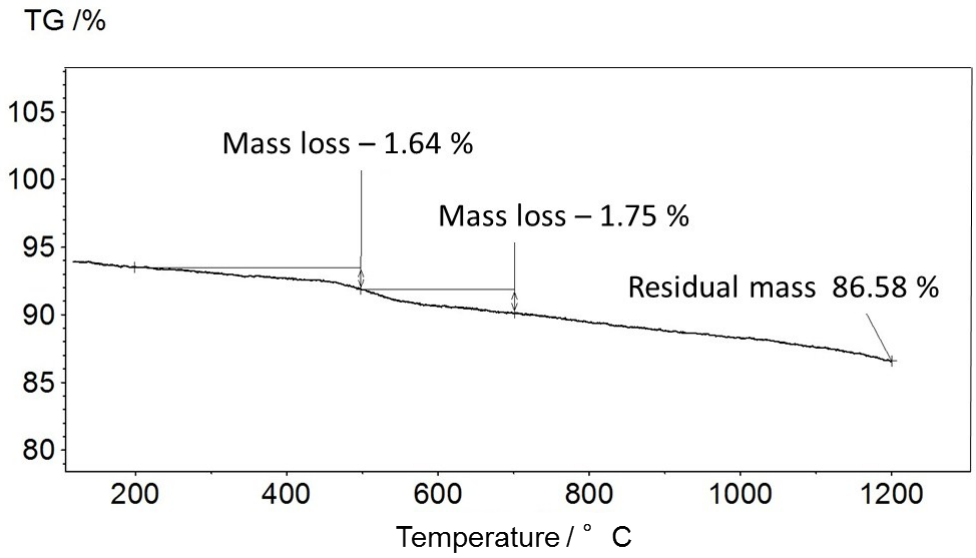

Fig. S5: Thermogravimetric measurement of a raolid mammal tooth fragment (sample 9 according to table 1 and figure 1).

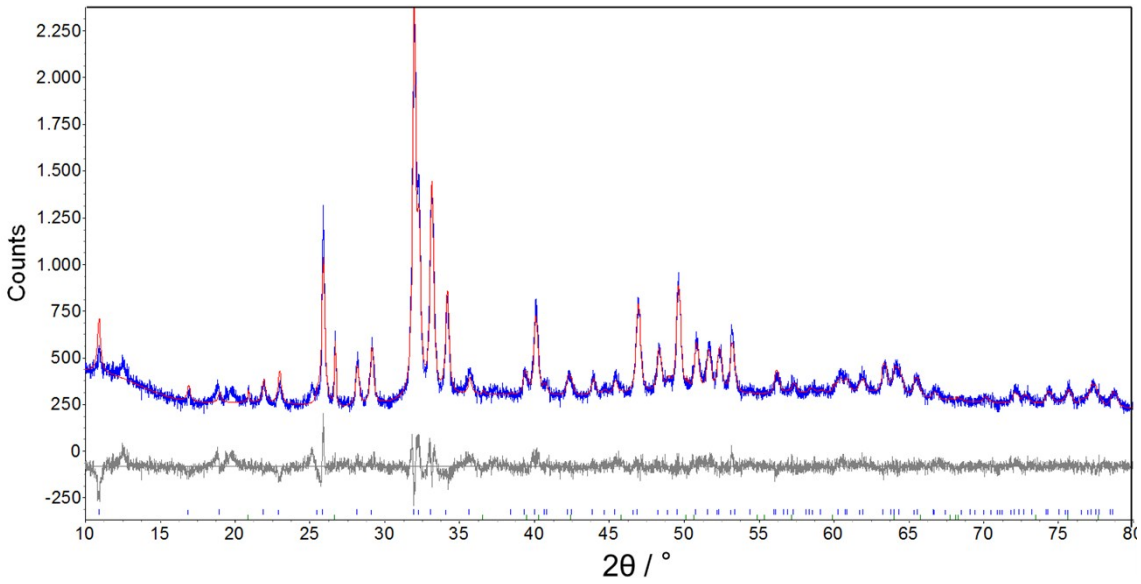

Fig. S6: Rietveld refinement of powder X-ray diffraction measurement of the raolid mammal tooth fragment (sample 9 according to table 1 and figure 1).

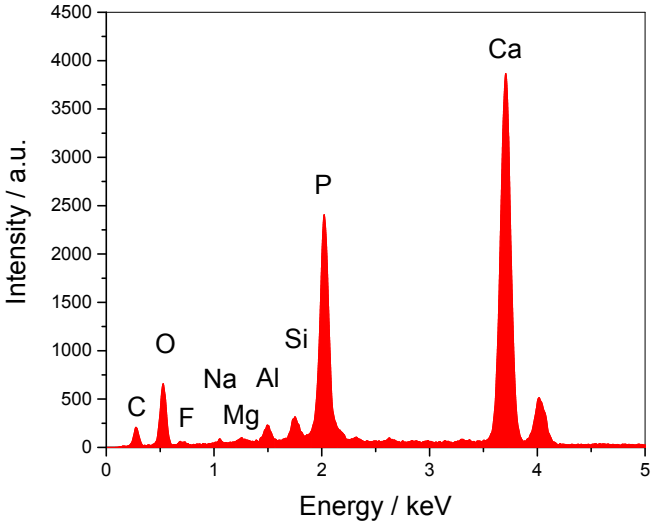

Fig. S7: EDX spectrum of the raolid mammal tooth fragment (sample 9 according to table 1 and figure 1).

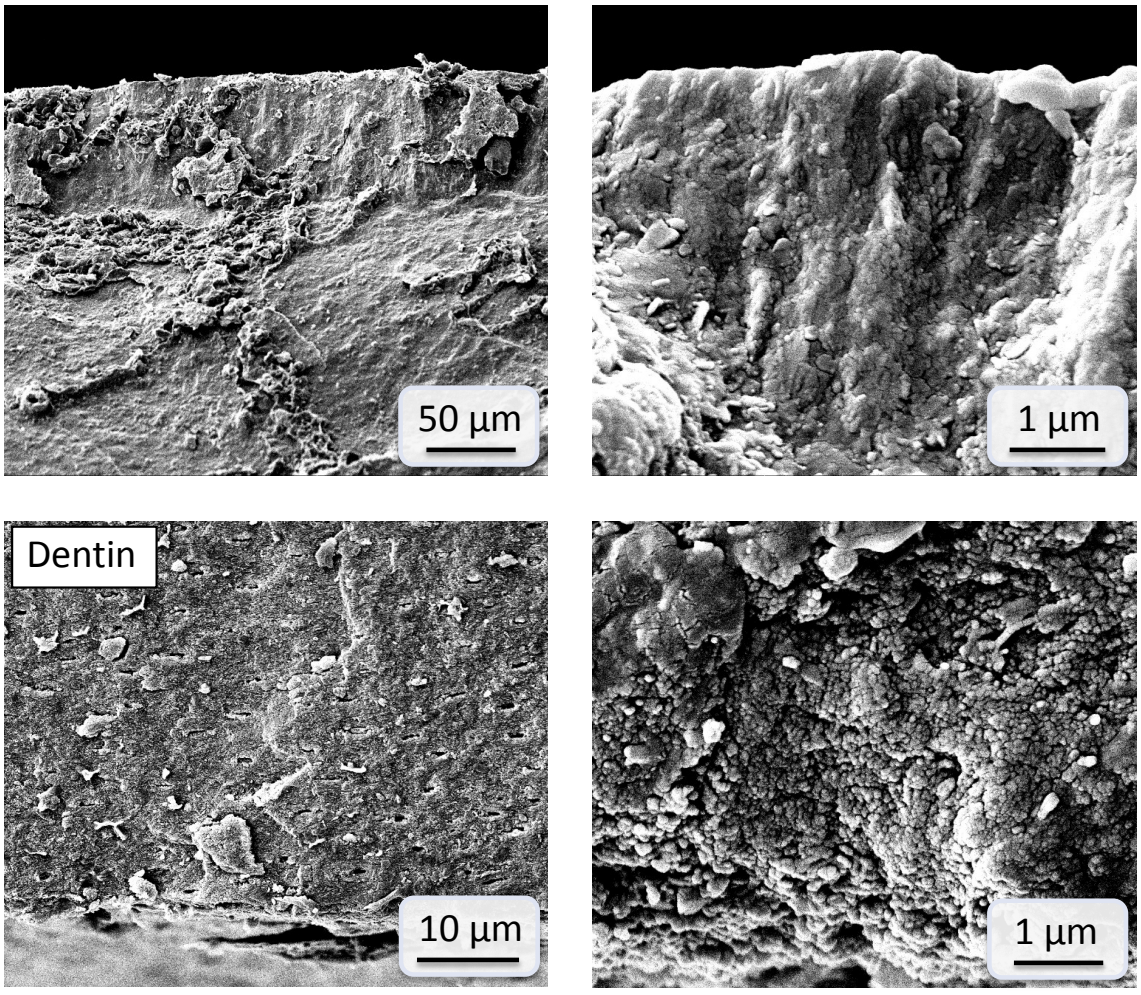

Fig. S8: SEM-images of a fractured tooth of the fossil crocodile *Tomistoma* (sample 11 according to table 1 and figure 1). Images above: overview of the enamel; images beneath: close-ups of dentin.

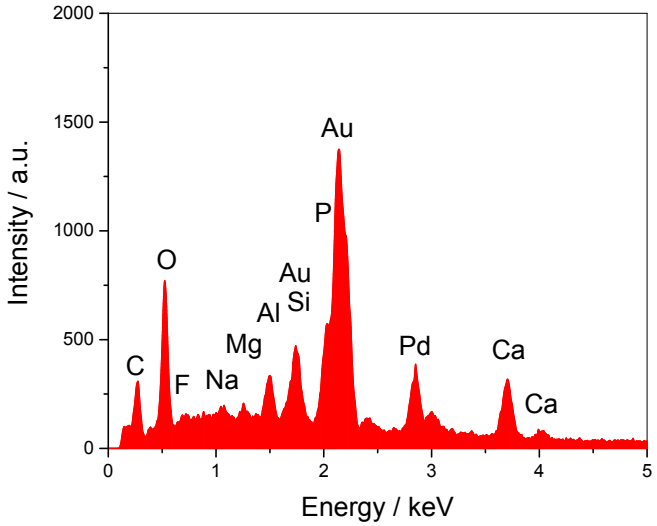

Fig. S9: EDX spectrum of a tooth (enamel) of the crocodile *Tomistoma* (sample 11 according to table 1 and figure 1).

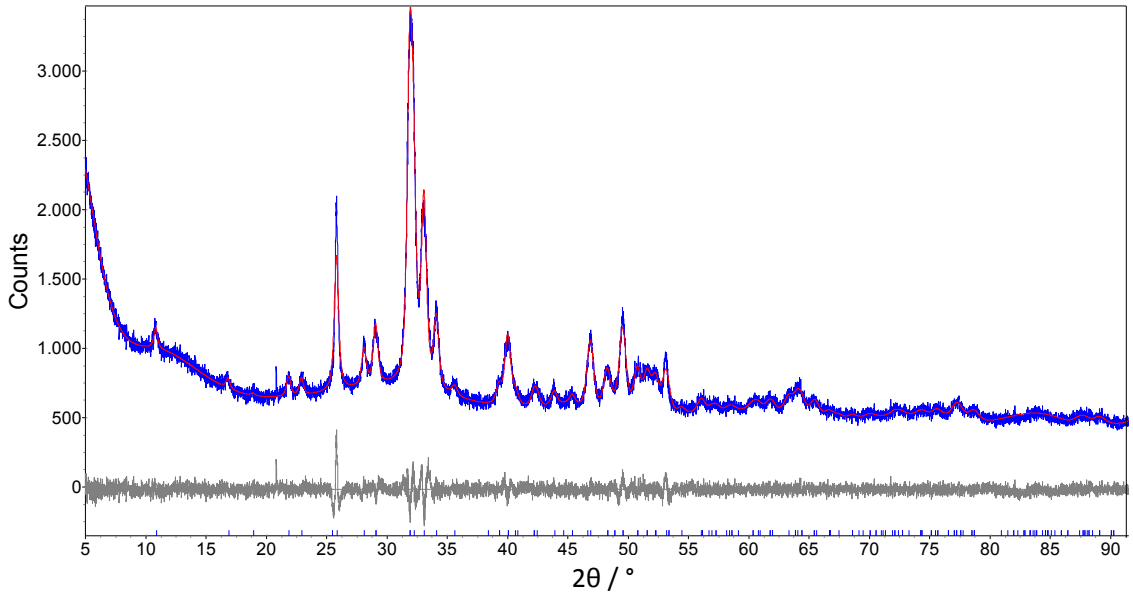

Fig. S10: Rietveld refinement of powder X-ray diffraction measurement of a *Tomistoma* tooth (enamel, sample 11 according to table 1 and figure 1).

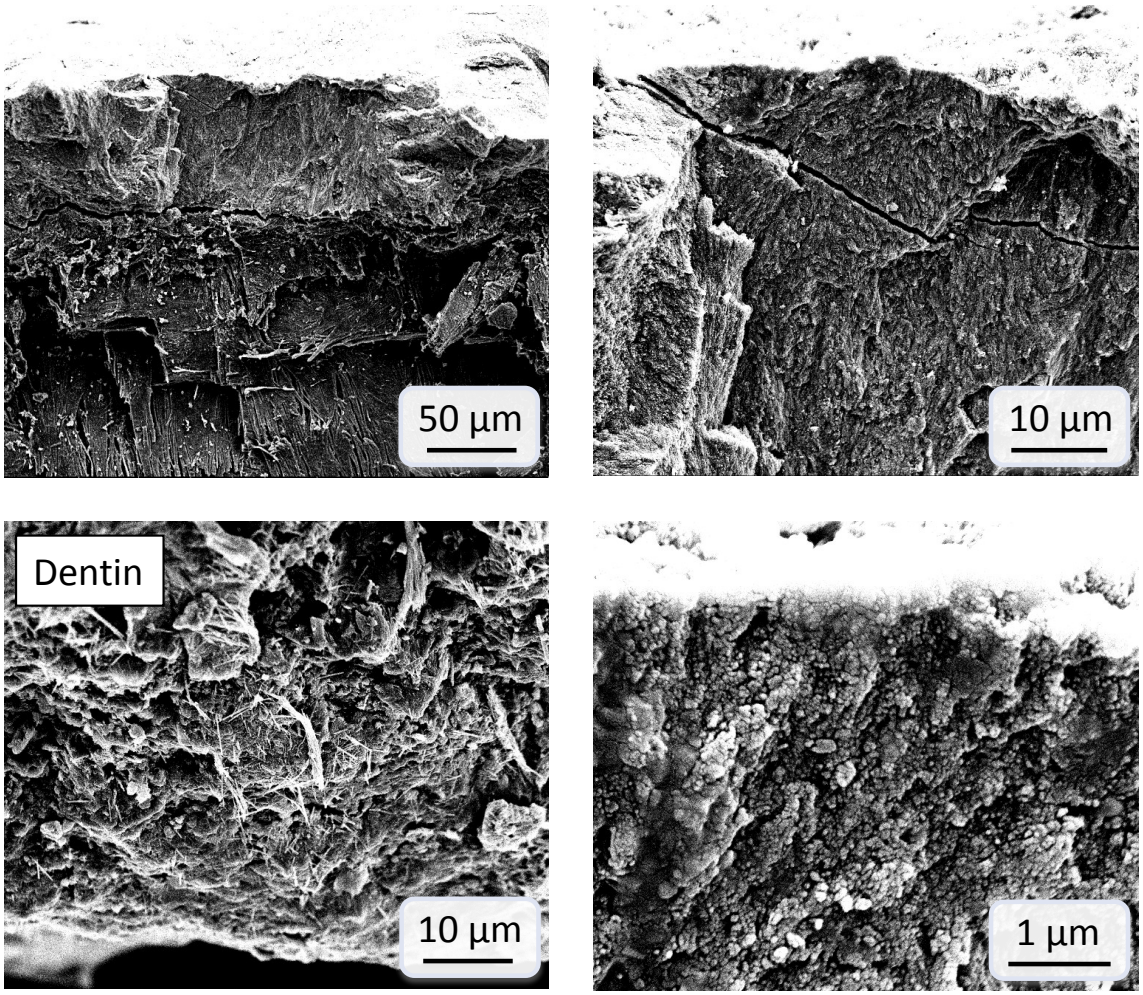

Fig. S11: SEM-images of a fractured tooth of the fossil shark species *Megaselachus chubutensis* (sample 12 according to table 1 and figure 1). Images above: overview of enameloid; images beneath: close-ups of dentin.

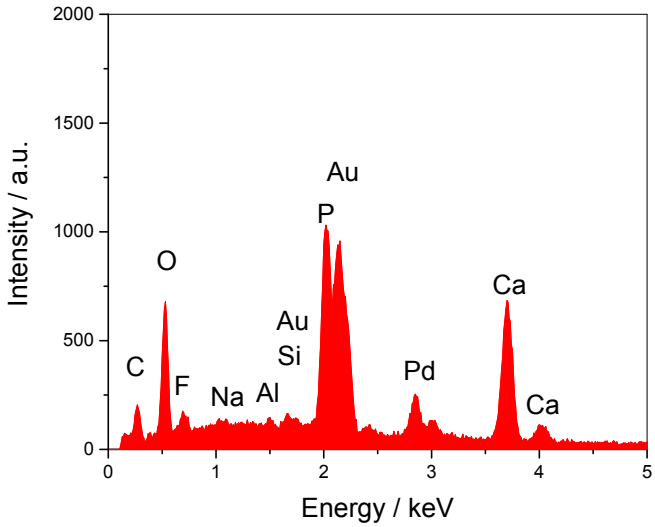

Fig. S12: EDX spectrum of the enameloid of a tooth of the fossil shark *Megaselachus chubutensis* (sample 12 according to table 1 and figure 1).

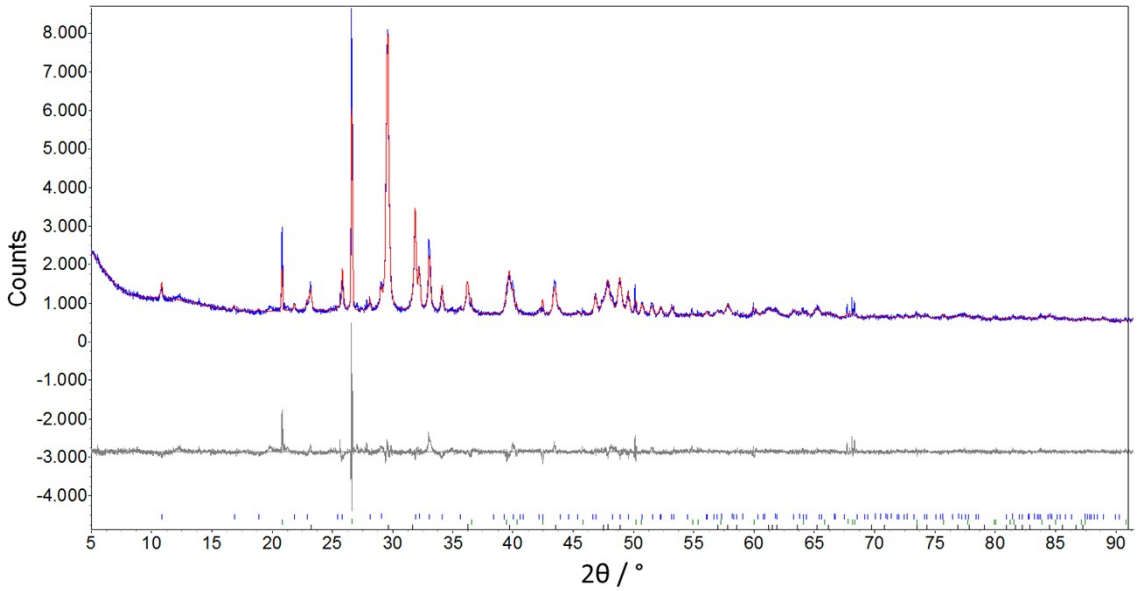

Fig. S13: Rietveld refinement of powder X-ray diffraction measurement of a tooth of the fossil shark *Megaselachus chubutensis* (sample 12 according to table 1 and figure 1).

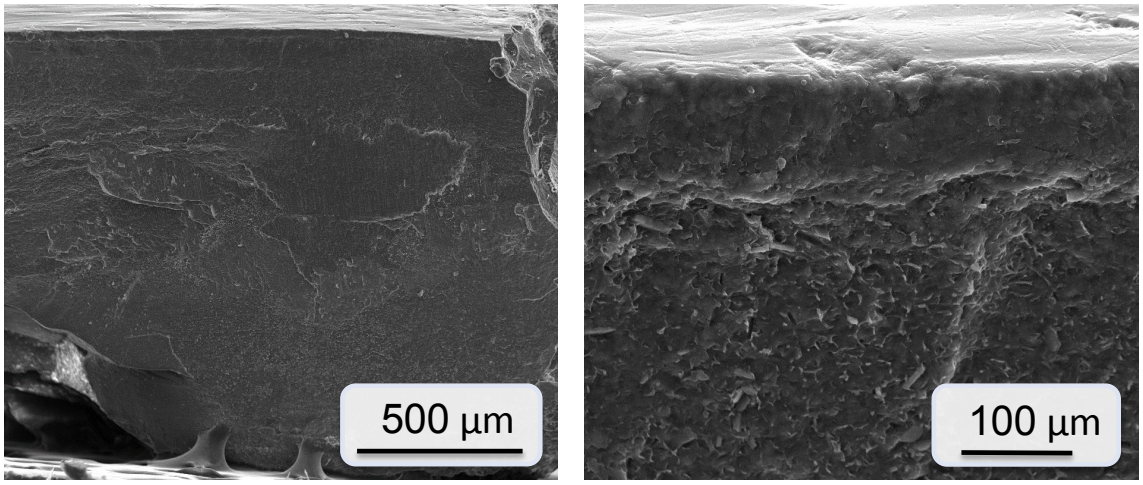

Fig. S14: SEM-images of a fractured tooth of the fossil crocodile *Gavialis* sp. showing the shiny layer and the enamel (sample 14 according to table 1 and figure 1).

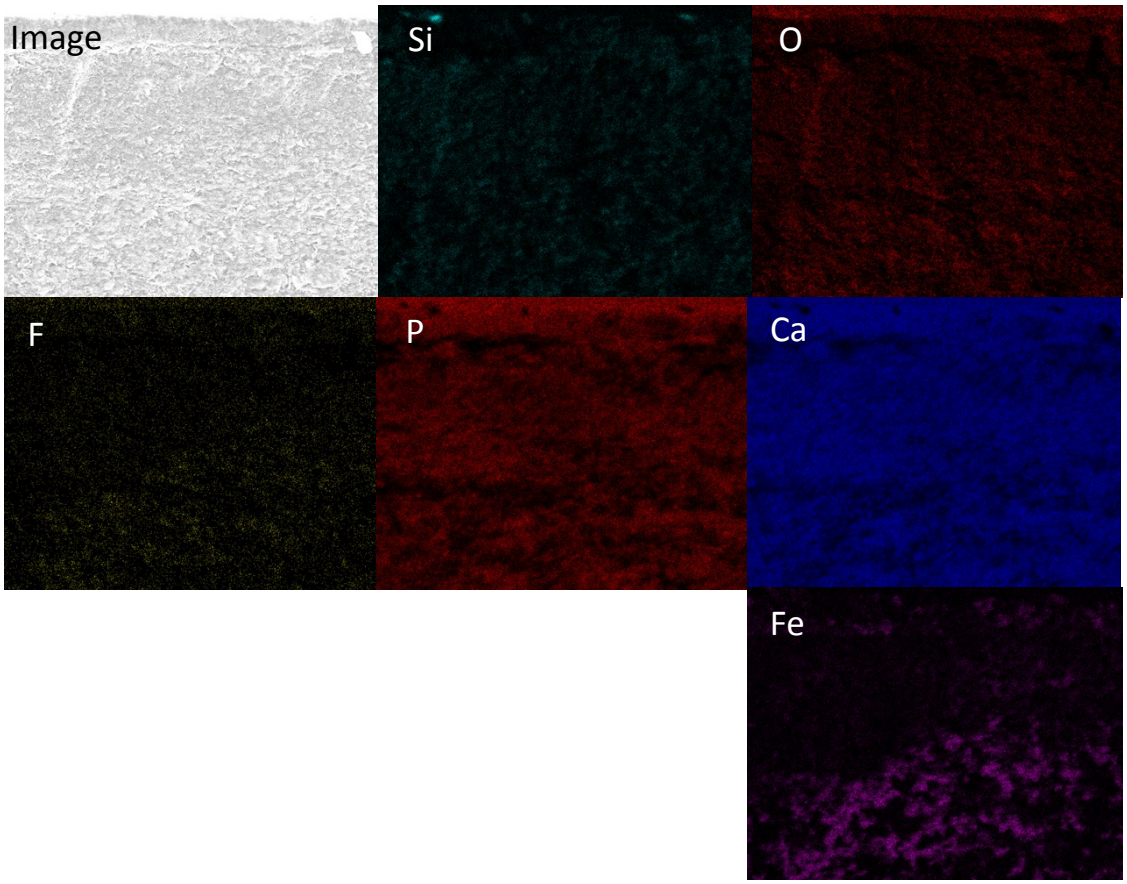

Fig. S15: EDX mapping of crocodile tooth of *Gavialis* sp. (sample 14 according to table 1 and figure 1).

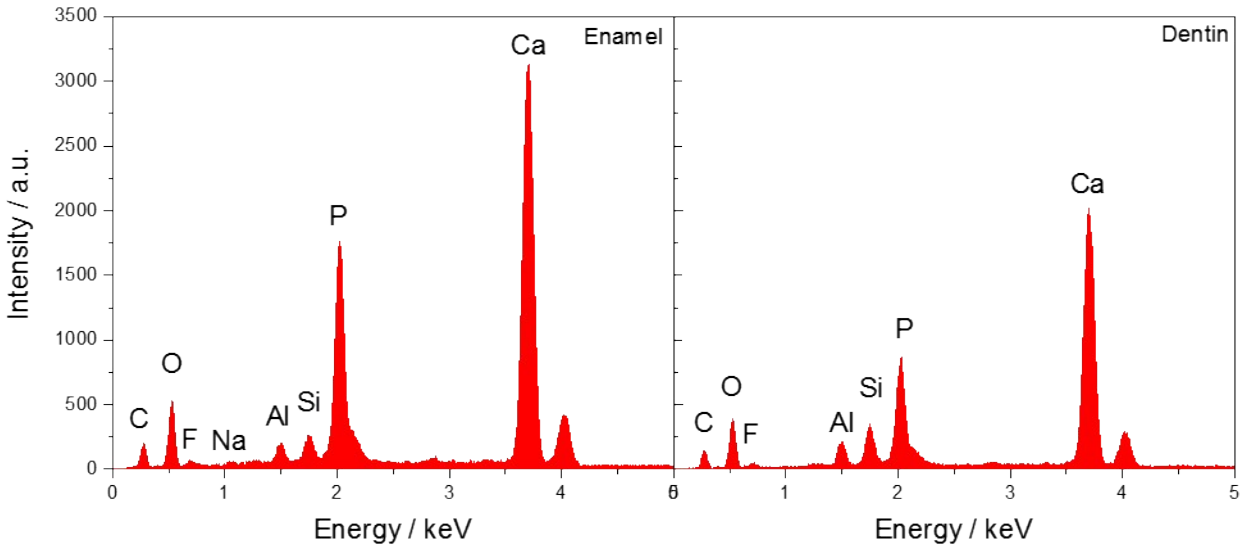

Fig. S16: EDX spectra of a fractured tooth of the fossil crocodile *Gavialis* sp. (sample 14 according to table 1 and figure 1).

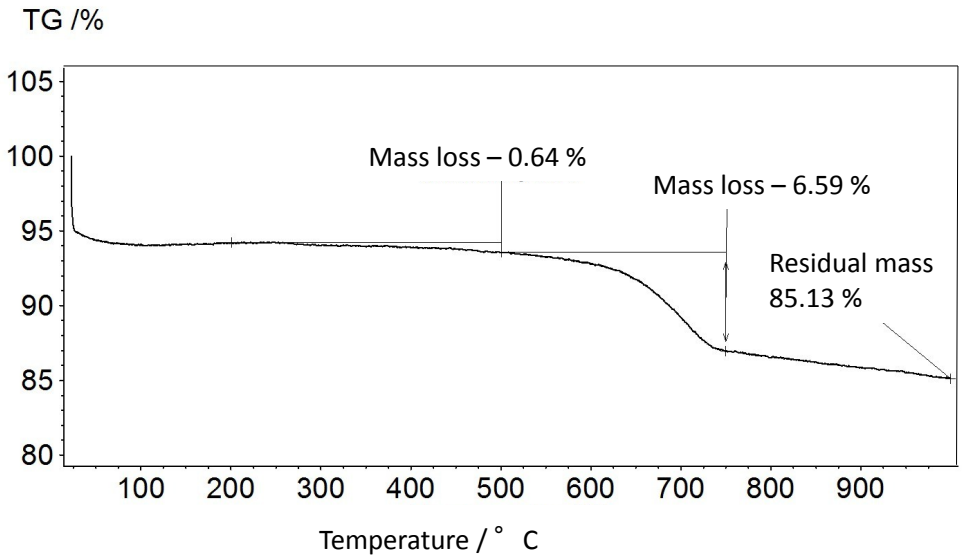

Fig. S17: Thermogravimetric measurement of a tooth of the fossil crocodile *Gavialis* sp. (sample 14 according to table 1 and figure 1).

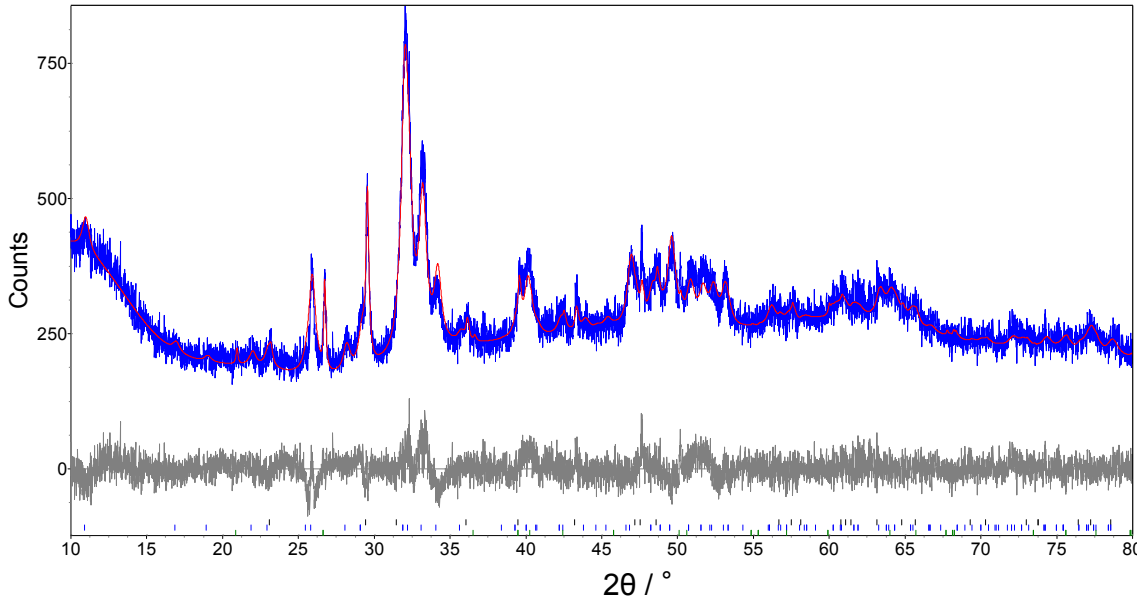

Fig. S18: Rietveld refinement of powder X-ray diffraction measurement of a tooth of the fossil crocodile *Gavialis* sp. (sample 14 according to table 1 and figure 1).

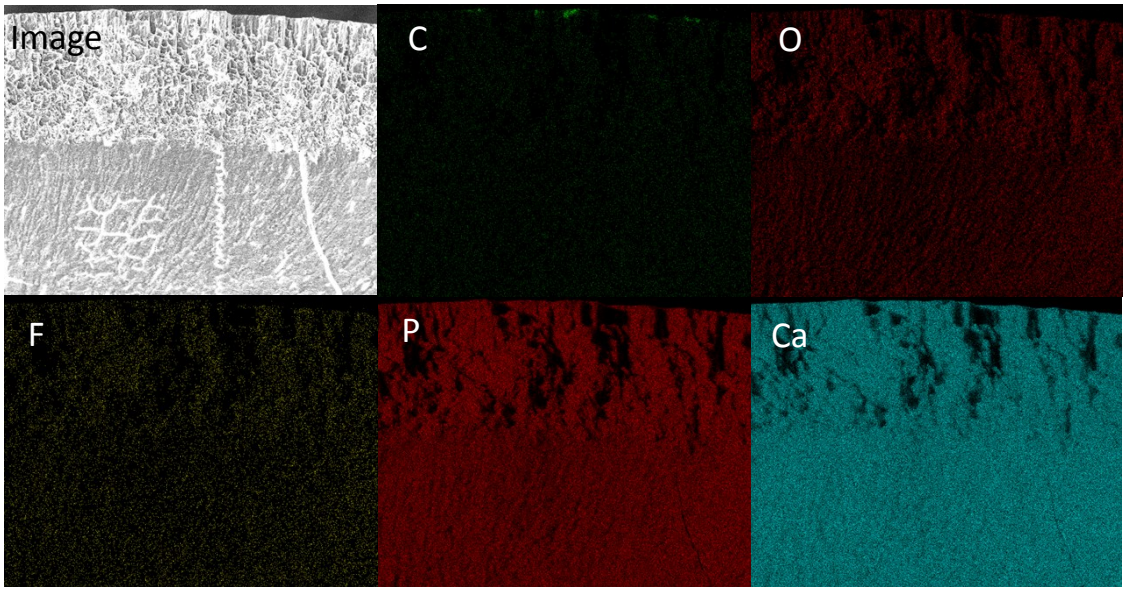

Fig. S19: EDX mapping of a fractured tooth of the fossil shark *Carcharinus* sp. (sample 15 according to table 1 and figure 1).

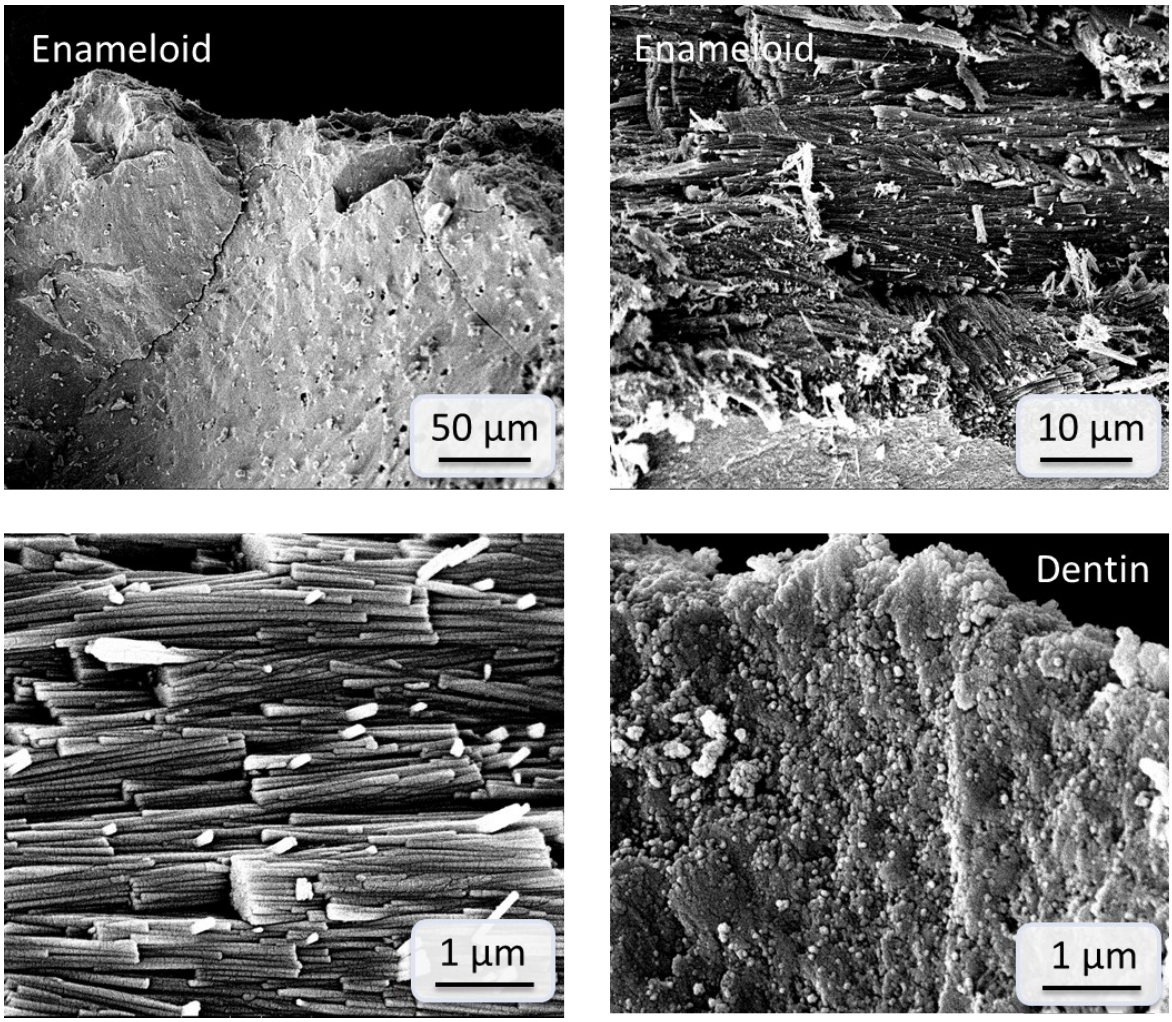

Fig. S20: SEM-images of a fractured tooth of the fossil shark *Lamna* sp. (sample 16 according to table 1 and figure 1).

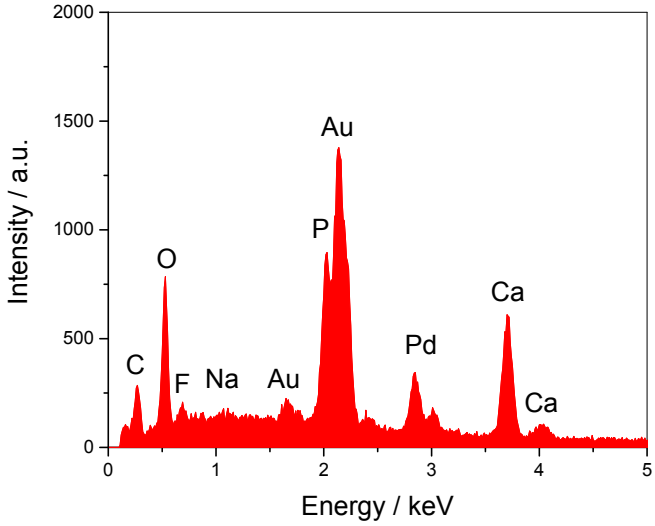

Fig. S21: EDX spectra of a tooth of the fossil shark *Lamna* sp. enameloid (sample 16 according to table 1 and figure 1).

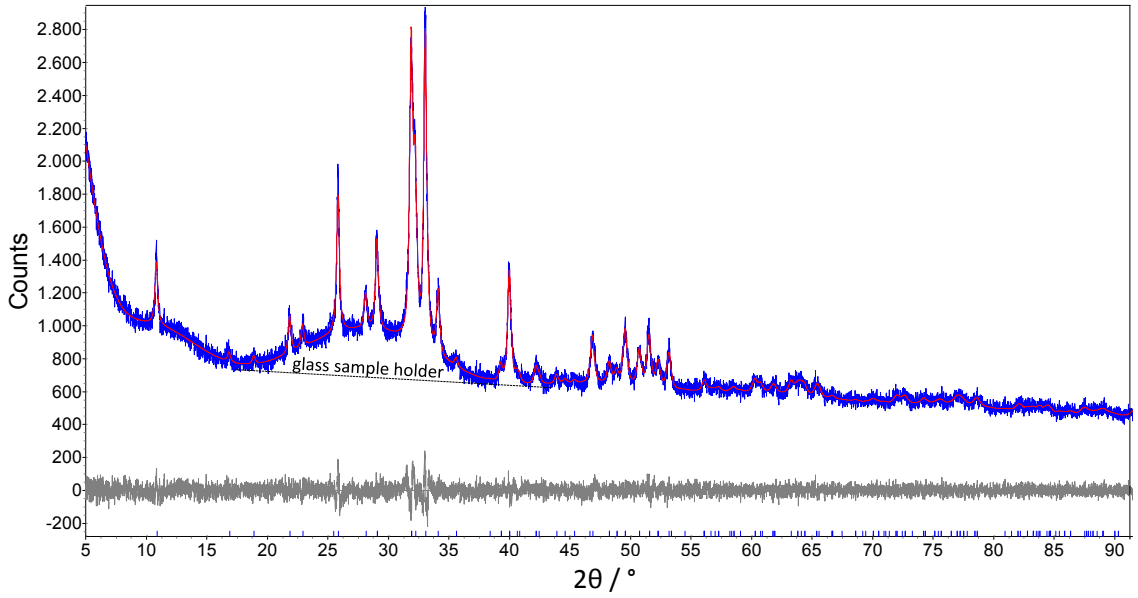

Fig. S22: Rietveld refinement of powder X-ray diffraction measurement of a tooth sample (comprising both dentin and enameloid) of the fossil shark *Lamna* sp. (sample 16 according to table 1 and figure 1).

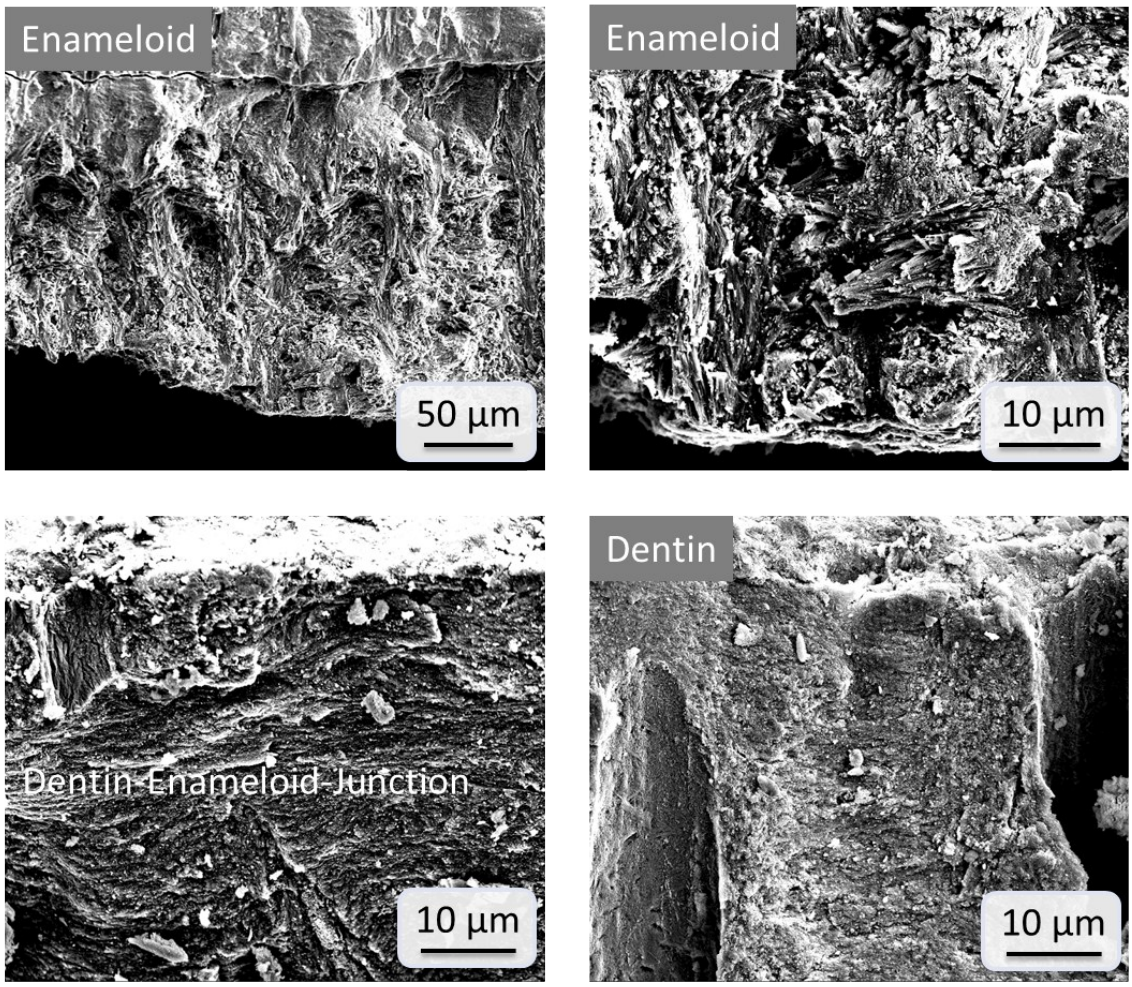

Fig. S23: SEM-images of a fractured tooth of the fossil shark *Carcharinus* sp. (sample 17 according to table 1 and figure 1).

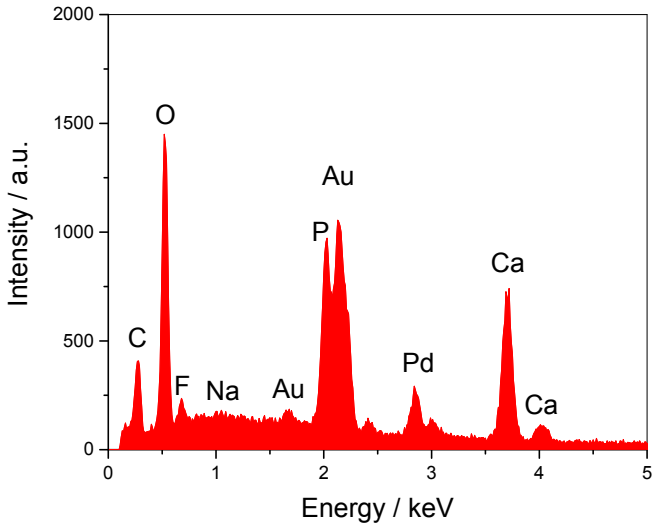

Fig. S24: EDX spectrum of a tooth of the fossil shark *Carcharinus* sp. enameloid (sample 17 according to table 1 and figure 1).

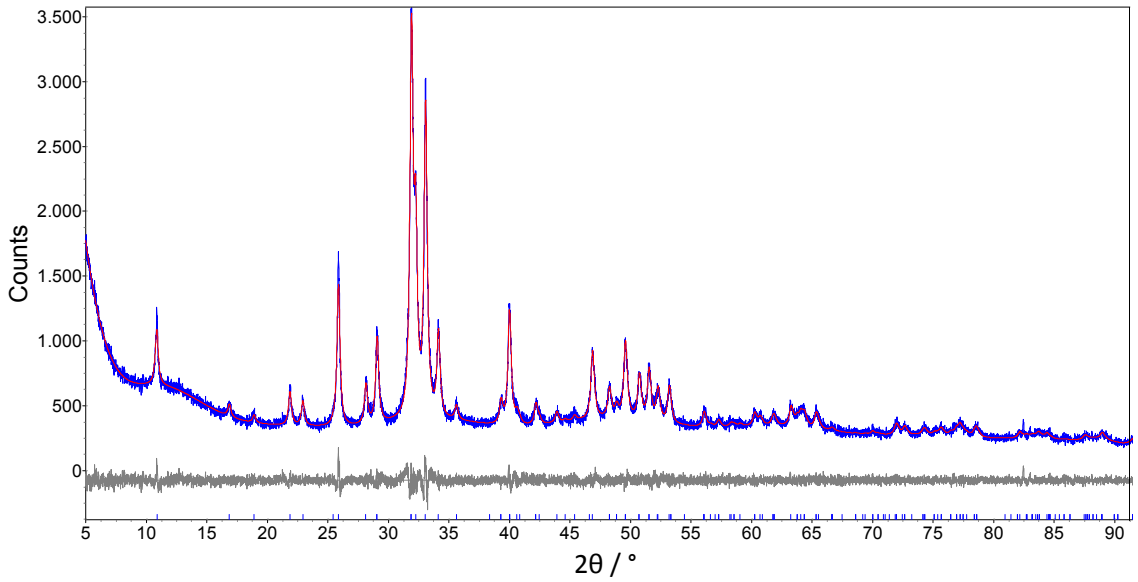

Fig. S25: Rietveld refinement of powder X-ray diffraction measurement of a tooth sample of the fossil shark *Carcharinus* sp. (sample 17 according to table 1 and figure 1).

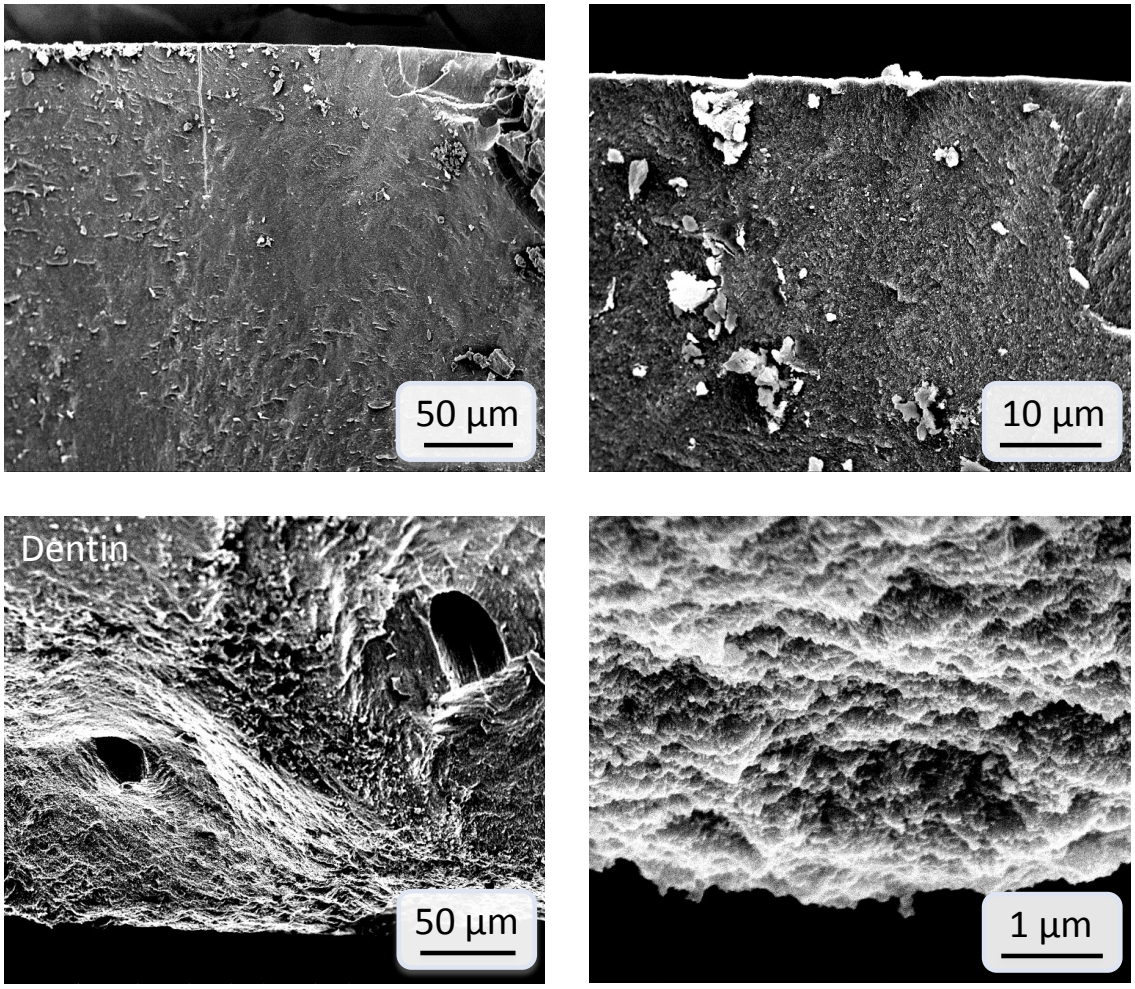

Fig. S26: SEM-images of a fractured tooth sample of the fossil ray *Myliobatis* sp. (sample 18 according to table 1 and figure 1). Images above: overview of enameloid; images beneath: close-up images of dentin.

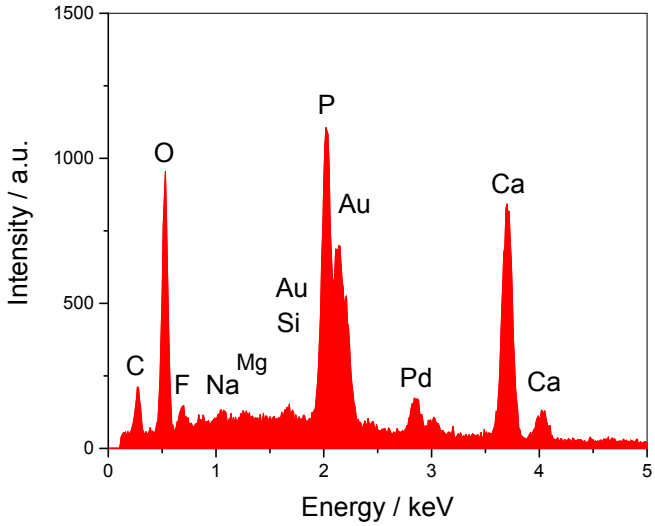

Fig. S27: EDX spectrum of a tooth of the fossil ray *Myliobatis* sp. enameloid (sample 18 according to table 1 and figure 1).

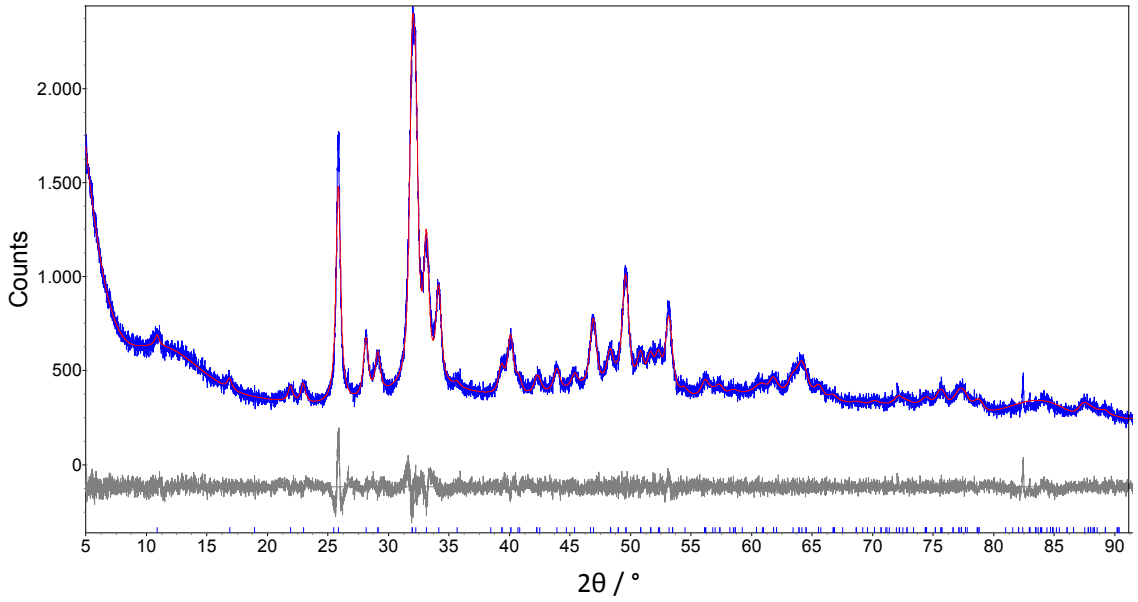

Fig. S28: Rietveld refinement of powder X-ray diffraction measurement of a tooth sample of the fossil ray *Myliobatis* sp. enameloid (sample 18 according to table 1 and figure 1).

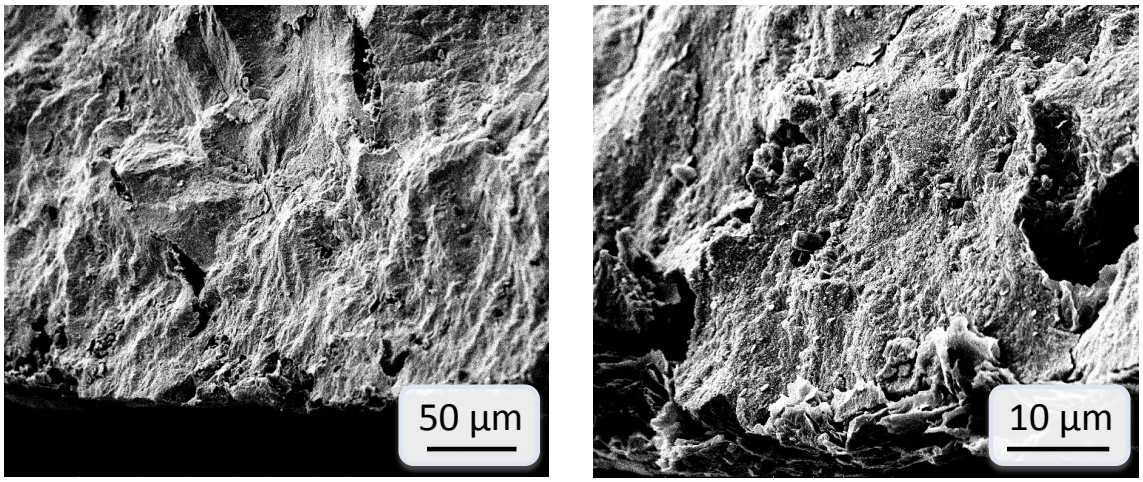

Fig. S29: SEM-images of a fractured tooth of the fossil shark *Carcharhinus perseus dentin* (sample 19 according to table 1 and figure 1).

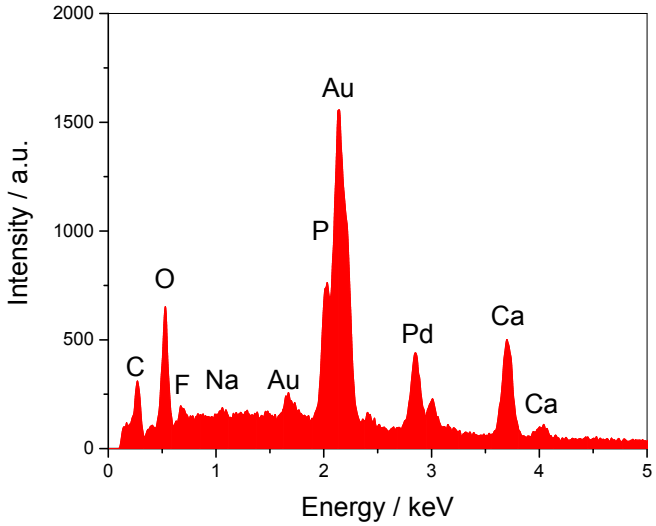

Fig. S30: EDX spectrum of a tooth of the fossil shark *Carcharhinus perseus* dentin (sample 19 according to table 1 and figure 1).

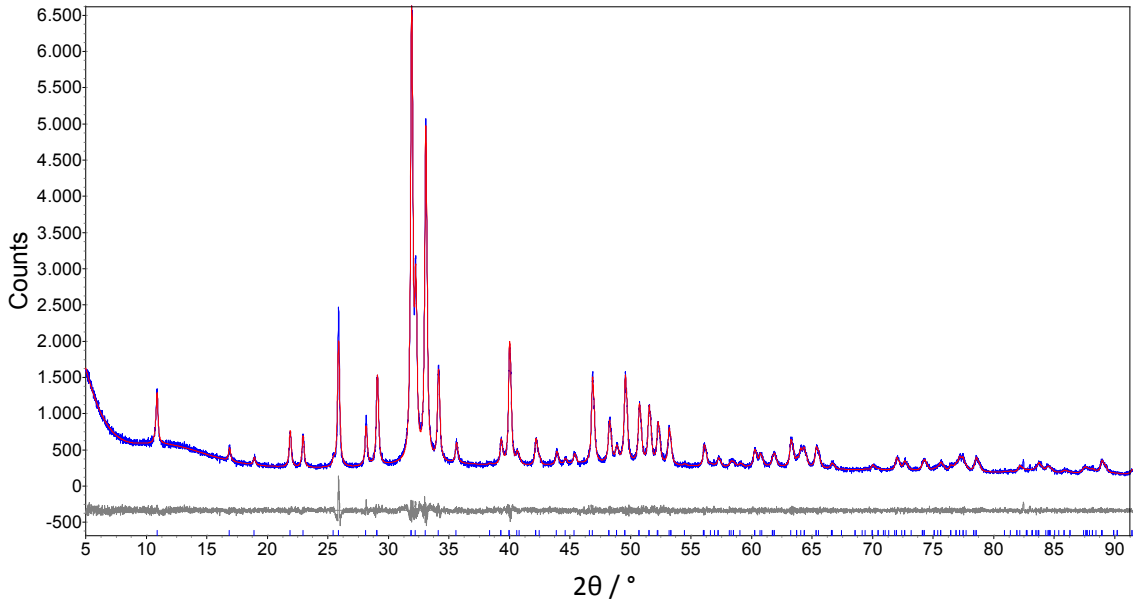

Fig. S31: Rietveld refinement of powder X-ray diffraction measurement of a tooth of the fossil shark *Carcharhinus perseus* enameloid (sample 19 according to table 1 and figure 1).

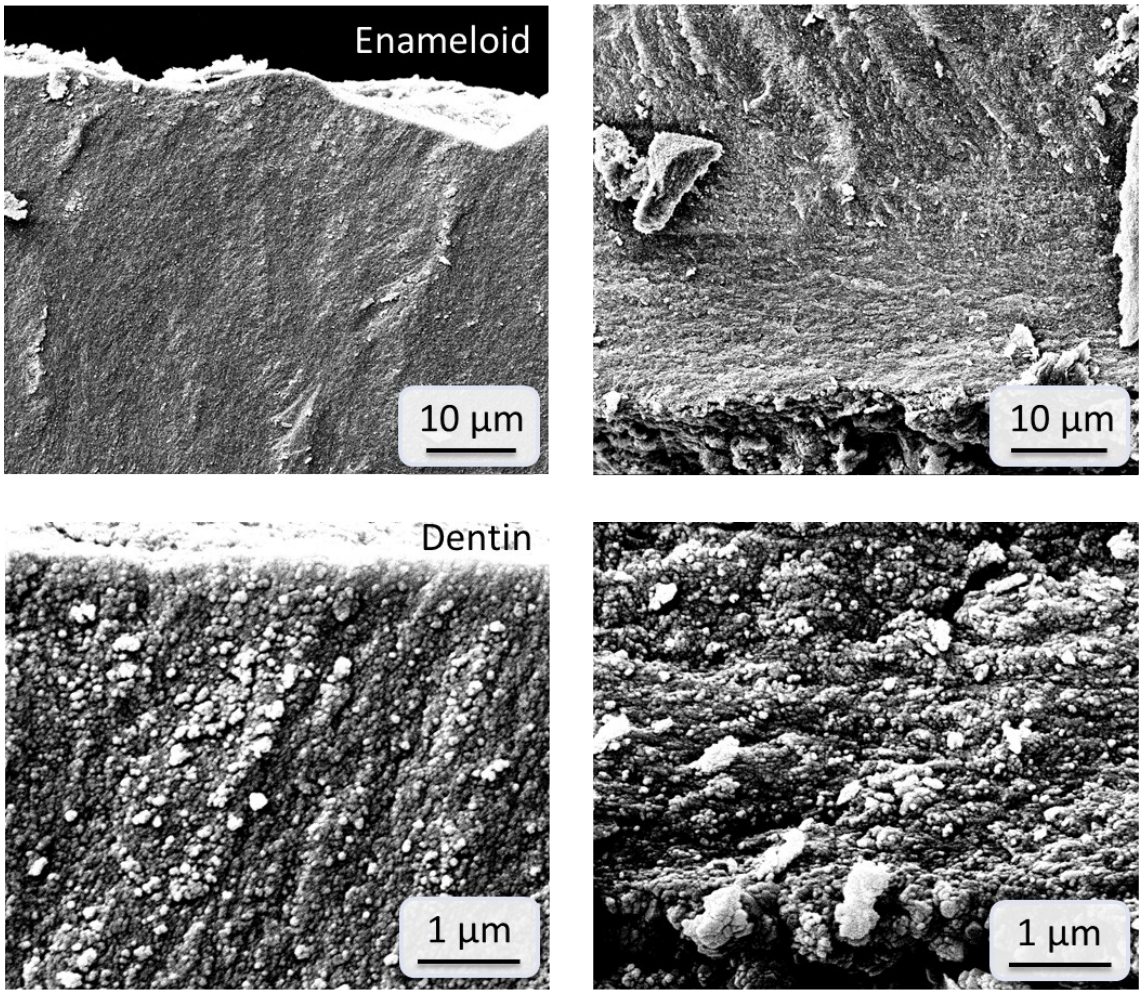

Fig. S32: SEM-images of a tooth of the fossil ray *Rhinoptera* sp. (sample 20 according to table 1 and figure 1).

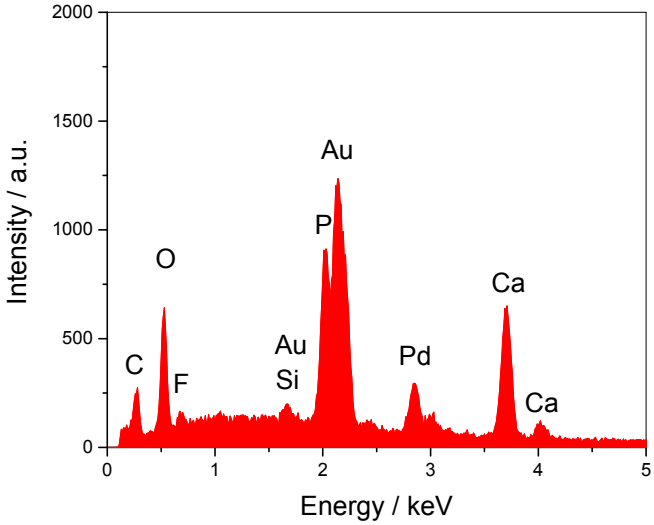

Fig. S33: EDX spectrum of a tooth of the fossil ray *Rhinoptera* sp. enameloid (sample 20 according to table 1 and figure 1).

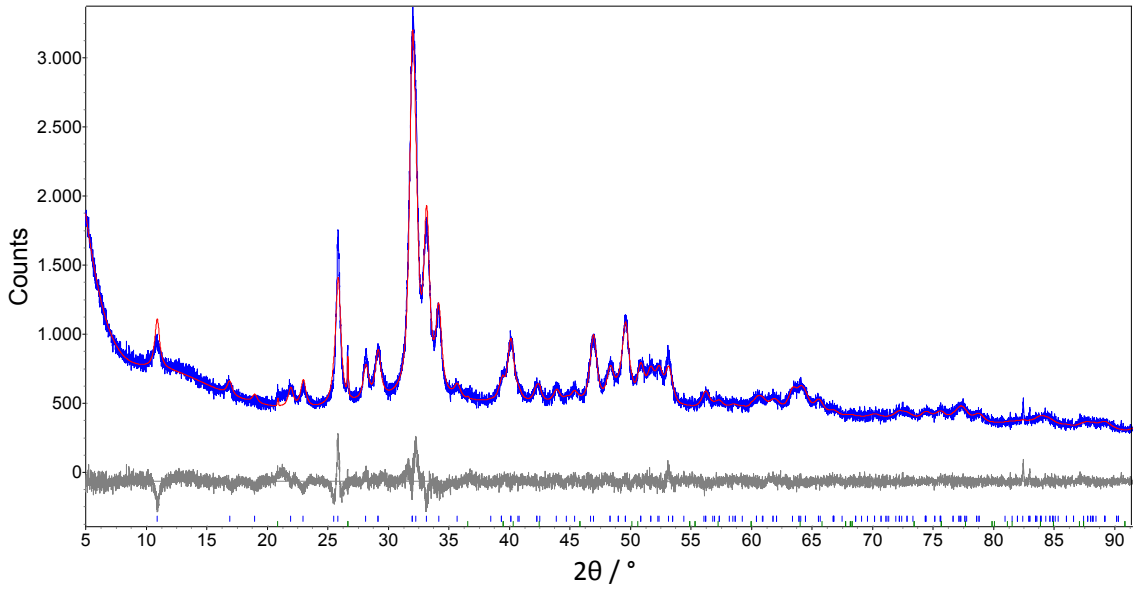

Fig. S34: Rietveld refinement of powder X-ray diffraction measurement of a tooth of the fossil ray *Rhinoptera* sp. (sample 20 according to table 1 and figure 1).

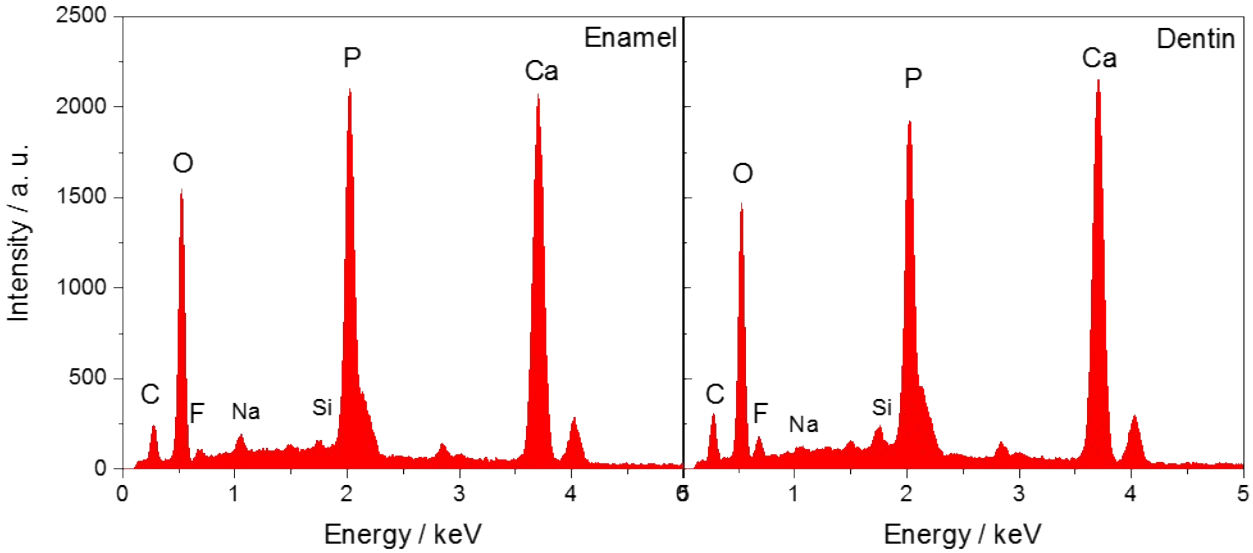

Fig. S35: EDX spectra of enamel and dentin of a tooth from the fossil crocodile *Crocodylus* sp. (sample 22 according to table 1 and figure 1).

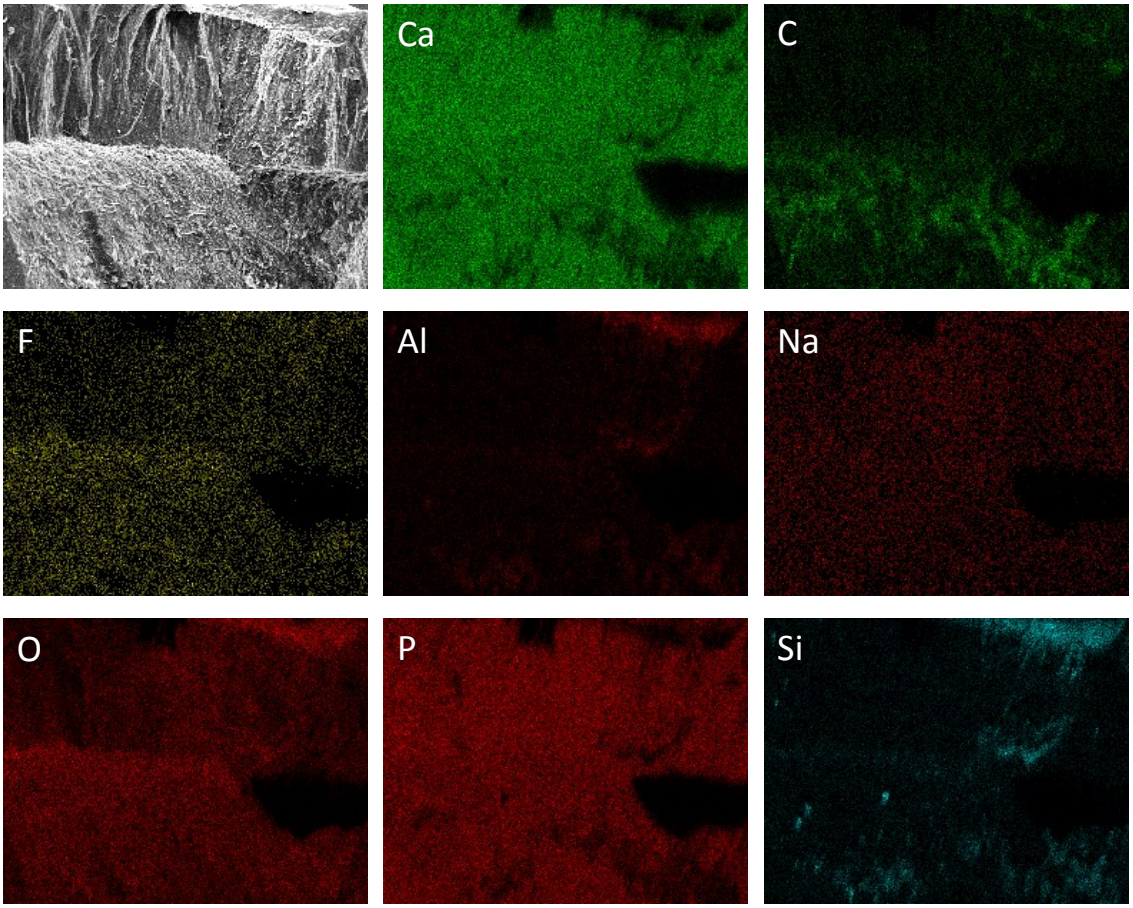

Fig. S36: EDX mapping of a fractured tooth of the fossil crocodile *Crocodylus* sp. (sample 22 according to table 1 and figure 1).

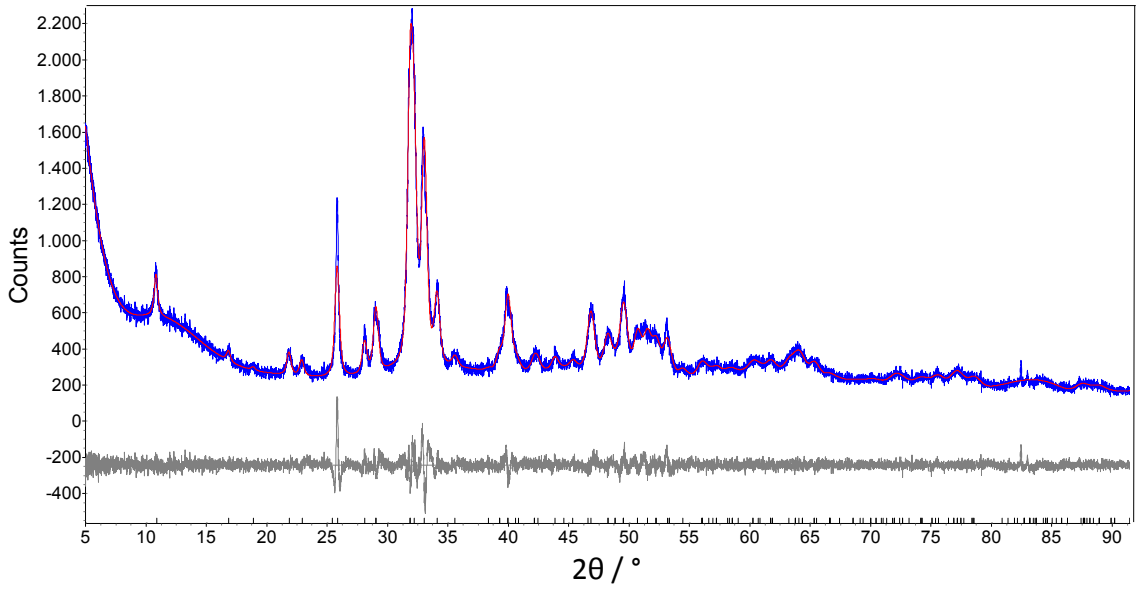

Fig. S37: Rietveld refinement of powder X-ray diffraction measurement of tooth enamel from the fossil crocodile *Crocodylus* sp. (sample 22 according to table 1 and figure 1).

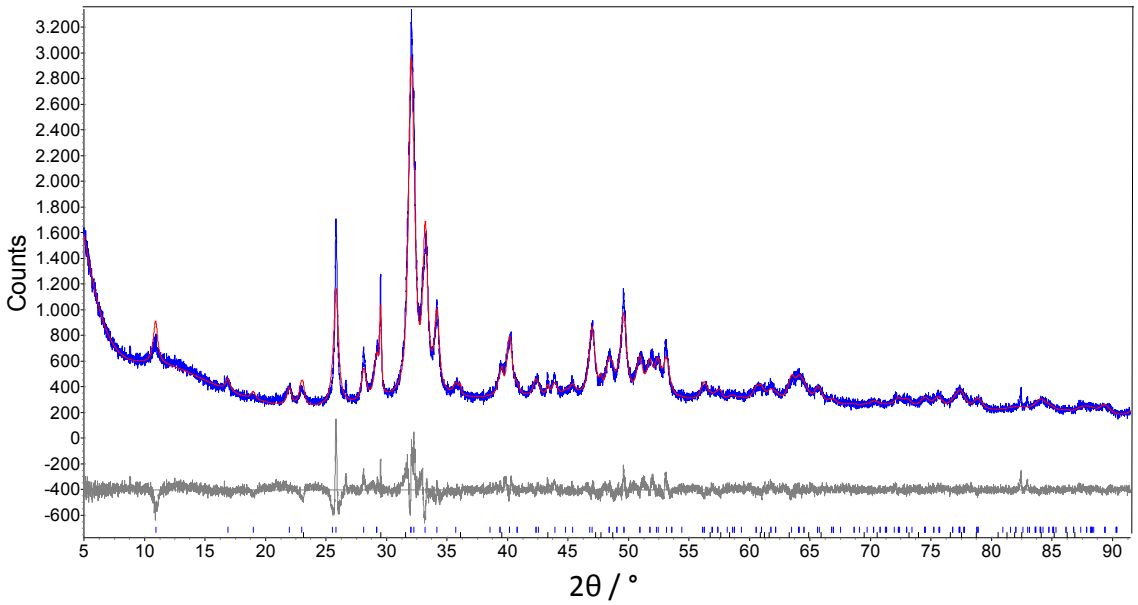

Fig. S38: Rietveld refinement of powder X-ray diffraction measurement of tooth dentin from the fossil crocodile *Crocodylus* sp. (sample 22 according to table 1 and figure 1).

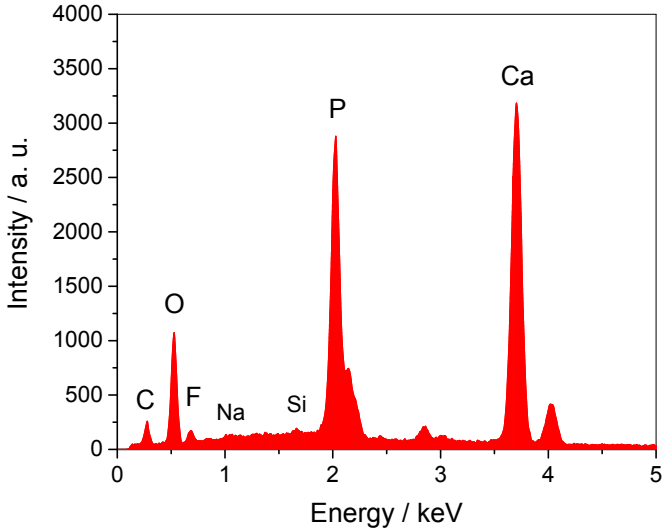

Fig. S39: EDX spectrum of jawbone tissue *substantia compacta* from the fossil crocodile *Crocodylus* sp. (sample 23 according to table 1 and figure 1).

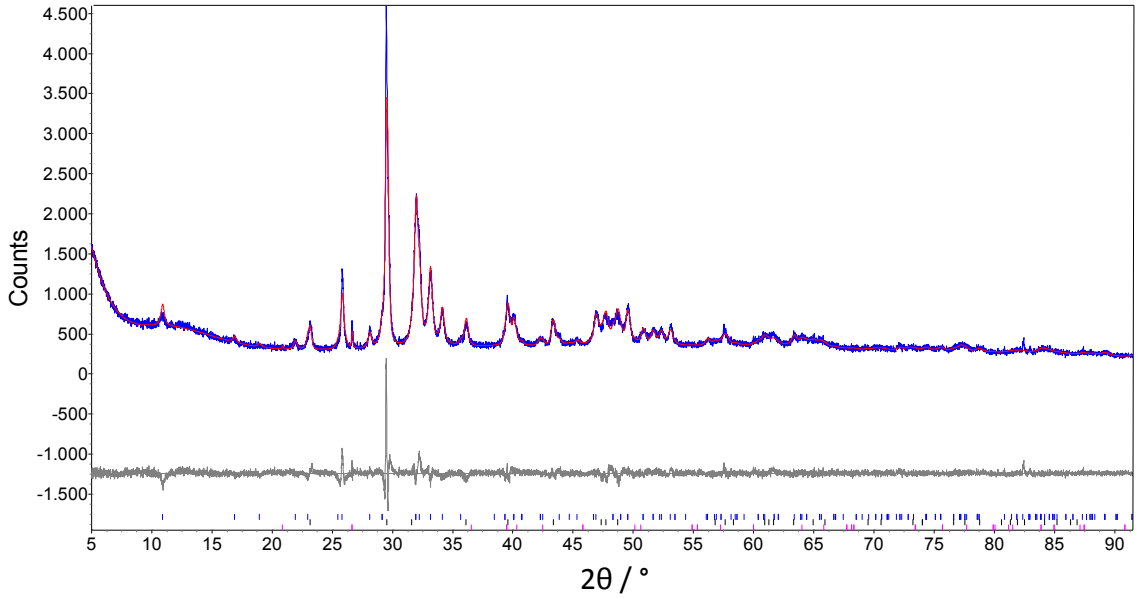

Fig. S40: Rietveld refinement of powder X-ray diffraction measurement of *substantia spongiosa* from the jawbone of the fossil crocodile *Crocodylus* sp. (sample 23 according to table 1 and figure 1).

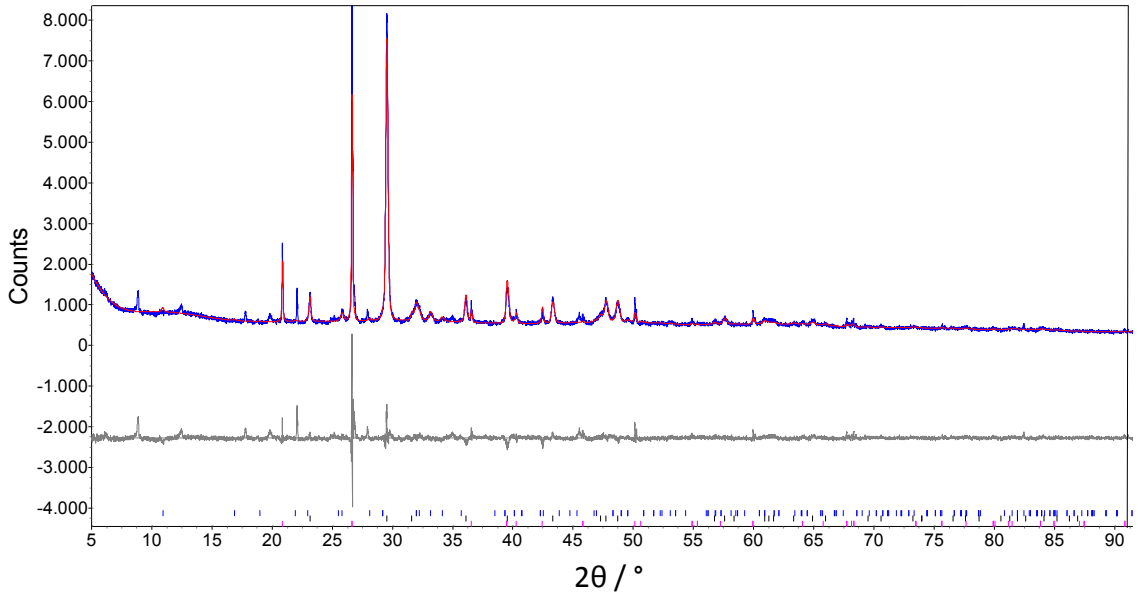

Fig. S41: Rietveld refinement of powder X-ray diffraction measurement of *substantia spongiosa* from the jawbone of the fossil crocodile *Crocodylus* sp. (sample 23 according to table 1 and figure 1).