

FIGURE 1

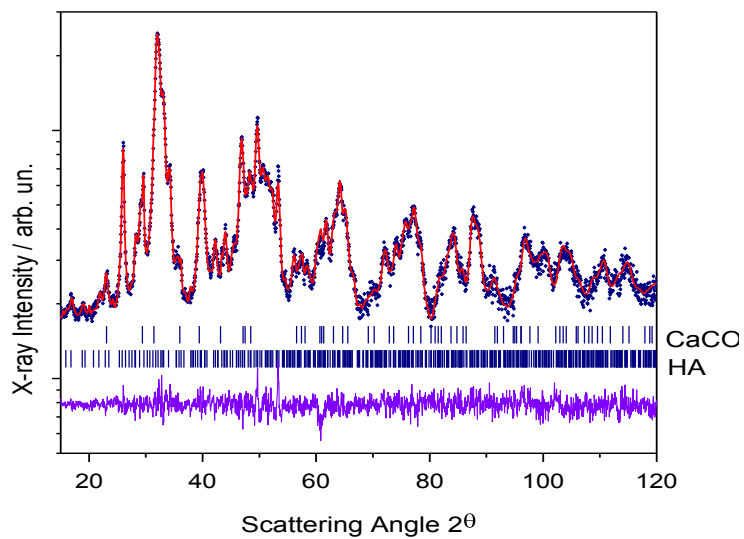


FIGURE 2

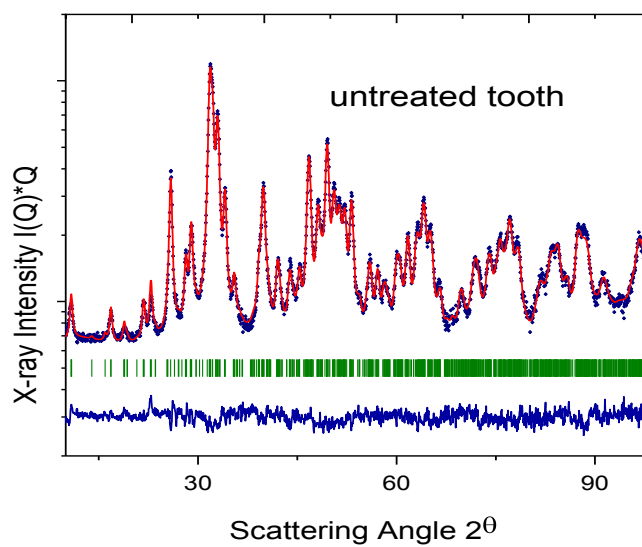


FIGURE 3a

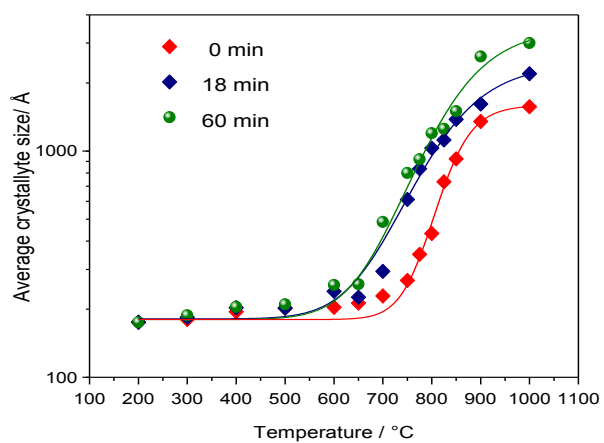


FIGURE 3b

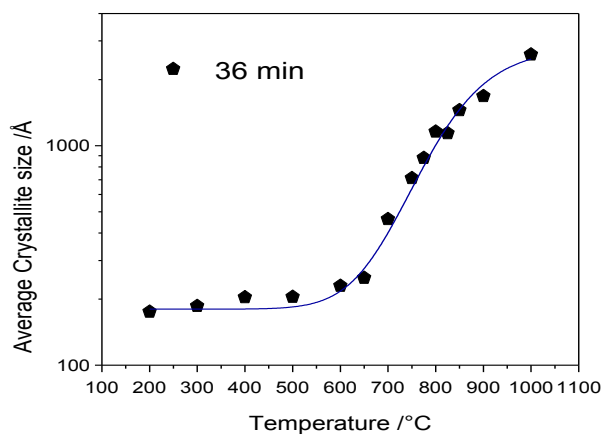


FIGURE 4

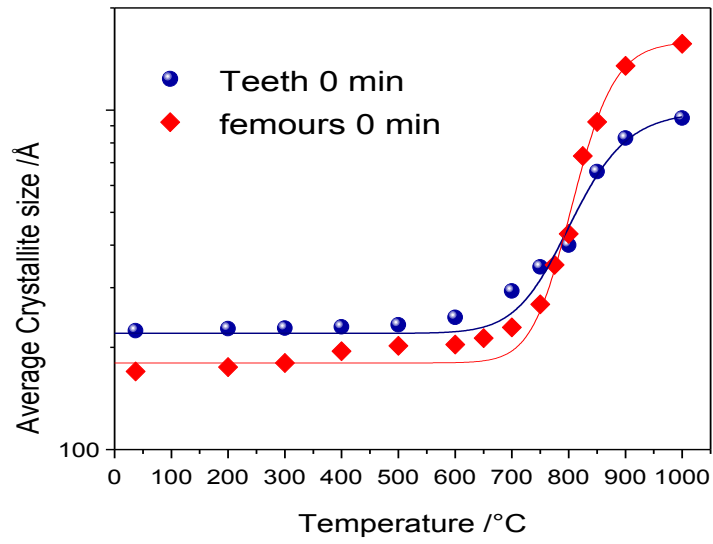


FIGURE 5

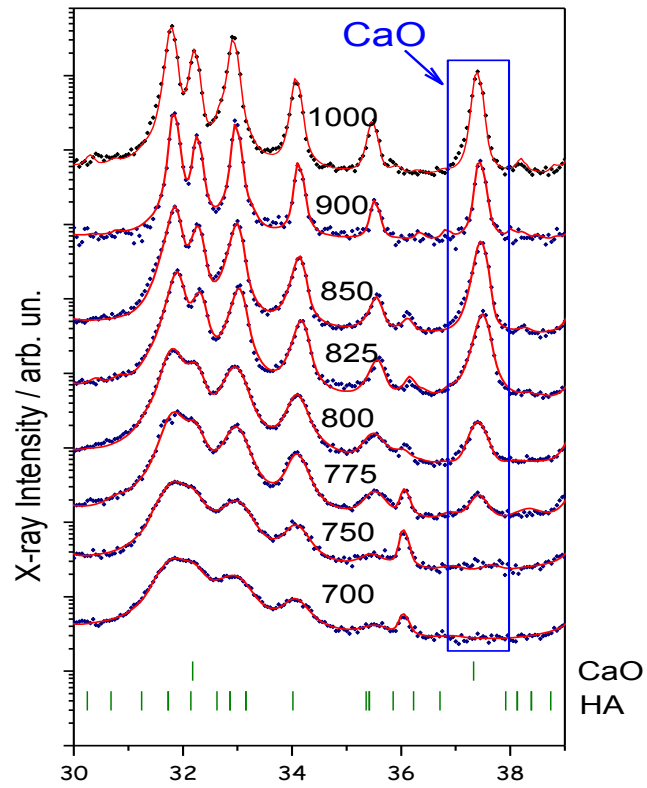
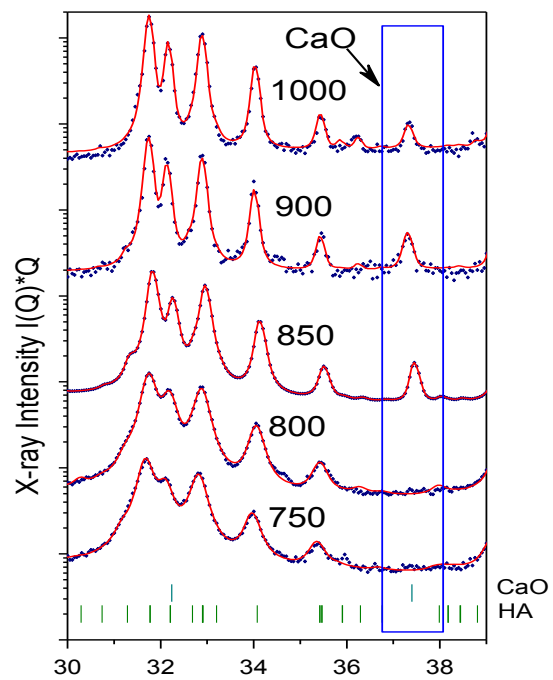


FIGURE 6



CAPTIONS TO ILLUSTRATIONS

Figure 1: The XRD powder pattern of untreated femour fragment used as sample reference coming from the Grave yard ossuary of Sassari. Experiment are data points, full line is the Rietveld refinement on the basis of Hydroxylapatite and calcite structure factors. The line at the bottom refers to the residuals, i.e., the difference between calculated and experimental square root intensities, which is indicative of the agreement obtained.

Figure 2: The XRD pattern (data points) and relevant Rietveld fit (full line) of an untreated tooth. From the quality of fit it is concluded that the tooth is made of pure apatite single-phase with average crystallite size of 224 Å, larger than the correspondent figure observed for human bones

Figure 3a & 3b: The average crystallite size evolution for Hydroxylapatite as a function of temperature treatment and residence times indicated. The experimental data from the Rietveld analysis have been fitted with sigmoid curves of logistic type which are typical of physico-chemical growth processes. The scatter of data and curves gives an idea of the uncertainty related to the determination of the temperature treatment for a bone of unknown provenance.

Figure 4: The comparison of the growth kinetics of HA crystallites as a function of temperature for teeth and bones at 0 min of residence time. Full lines are fit of experimental data according to the logistic function reported in the text. The characteristic temperature of the process (i.e. the inflection point of curves) is the same in the two cases while the sharpness and amplitude is larger for bones.

Figure 5: A selected range of the XRD patterns of sample bone treated at the indicated temperatures. It is evident the progressive peak sharpening of Hydroxylapatite as a function of the Indicated temperatures, simultaneous to the appearance of CaO phase following the decarbonatation reaction which starts at 775 °C.

Figure 6. A selected portion of the XRD patterns of teeth treated at the quoted temperatures (data points) with the correspondent Rietveld fit (full lines). The appearance of the CaO cubic phase is perceived after treatment at 850 °C. The fraction of CaO with respect to HA is lower than for the case of bones.

