

SUPPLEMENTARY MATERIAL

Figure S1

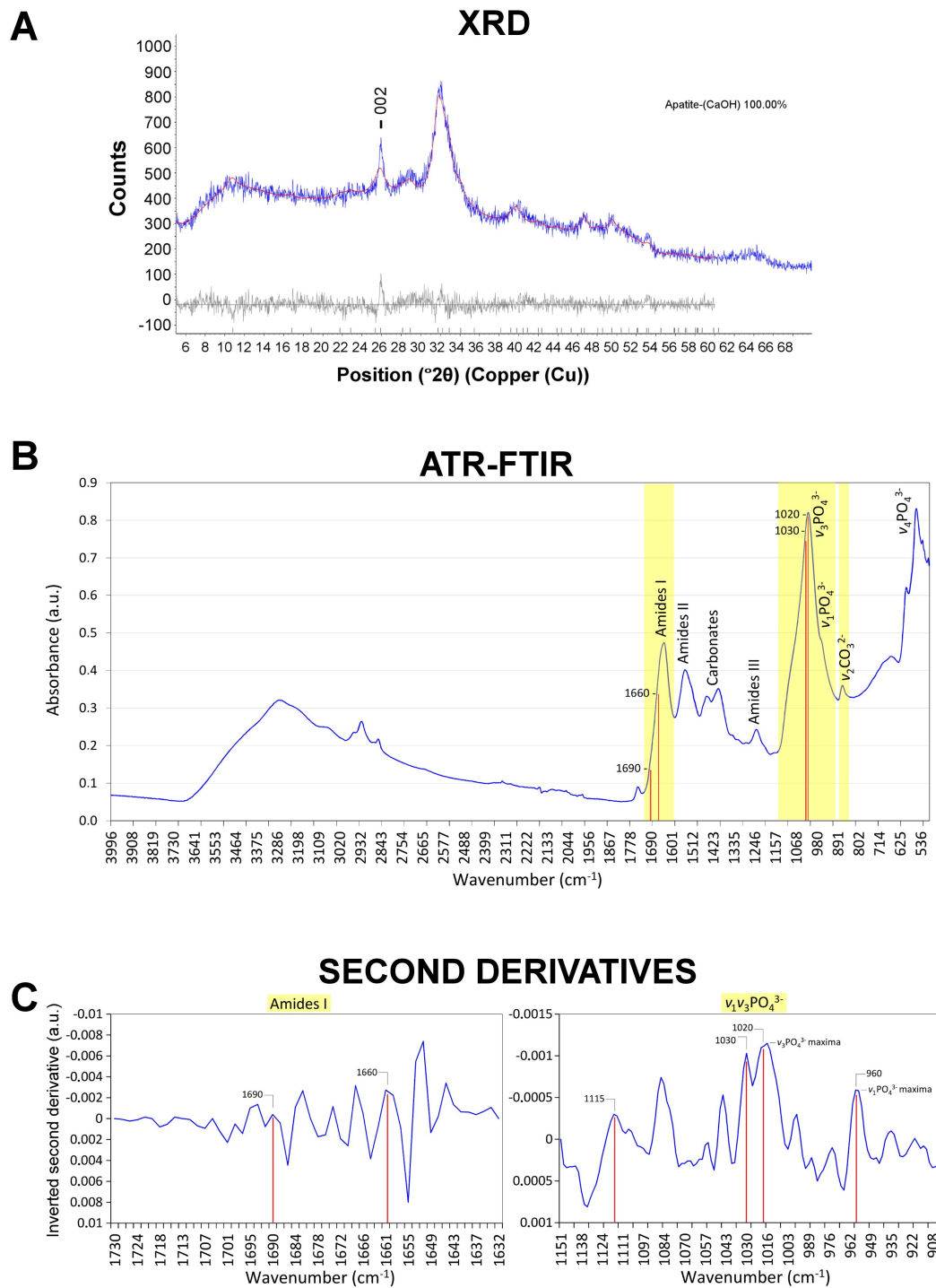


Table S1. Quantitative analysis of crystallographic properties of bone hydroxyapatite-(CaOH) in the femur of *Pappa2^{wt/wt}* and *Pappa2^{ko/ko}* mice (males and females) by XRD and Rietveld refinement (COD no. 9010050; Ca5 H2 O13 P3)¹.

	Male		Female	
	wt/wt	ko/ko	wt/wt	ko/ko
R-Bragg factor (R_B)²	0.985 ± 0.080	0.999 ± 0.018	0.912 ± 0.041	1.252 ± 0.313
Cell Volume (Å³)	529.67 ± 0.95	529.45 ± 1.42	529.97 ± 0.36	530.53 ± 0.94
Crystal Linear Abs. Coeff. (1/cm)³	273.93 ± 0.34	273.10 ± 0.31	273.44 ± 0.18	273.16 ± 0.48
Crystal Density (g/cm³)	3.153 ± 0.003	3.143 ± 0.003	3.147 ± 0.002	3.144 ± 0.005

¹ Data are represented as mean ± S.E.M. ($n = 7$ /group). No interaction and main effects were found. See **Table 1** and **Figure S1A** for representative diffractograms.

² **R-Bragg factor (R_B):** The R factor measuring the agreement between the reflection intensities calculated from a crystallographic model and those measured experimentally.

³ **Crystal Linear Absorption Coefficient (1/cm):** a measure of the photon beam attenuation by a material due to absorption and scattering processes.

Table S2. Quantitative analysis of spectral levels (actual absorbance) of specific ionic contents in the femur of *Pappa2^{wt/wt}* and *Pappa2^{ko/ko}* mice (males and females)¹.

	Male		Female	
	wt/wt	ko/ko	wt/wt	ko/ko
Absorbance (a.u.)				
Phosphates ($\nu_1\nu_3\text{PO}_4^{3-}$)	0.445 ± 0.017	0.632 ± 0.049	0.614 ± 0.048	0.621 ± 0.029
Carbonates ($\nu_2\text{CO}_3^{2-}$)	0.245 ± 0.005	0.281 ± 0.010	0.271 ± 0.007	0.263 ± 0.008
Amides I ($\nu\text{C=O}$)	0.425 ± 0.011	0.441 ± 0.007	0.422 ± 0.003	0.413 ± 0.009

¹ Data are represented as mean ± S.E.M. ($n = 7$ /group). See **Figure S1B** for representative spectra.