Electronic Supporting Information

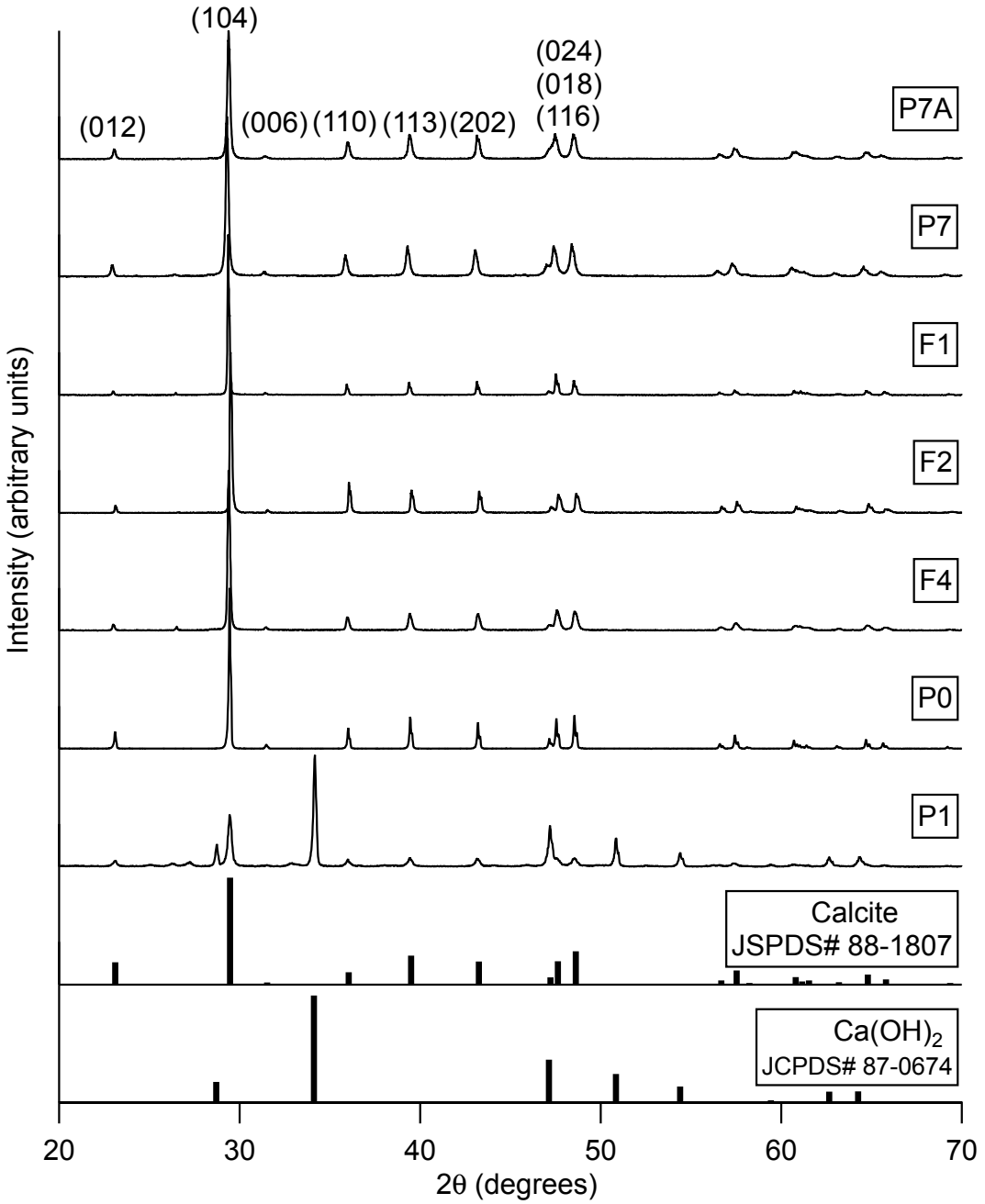

Fig. S1 Representative XRD diffraction data for different calcite samples, and JCPDS standards for calcite (88-1807) and $Ca(OH)_2$ (87-0674).[32] S1 is the only sample that shows $Ca(OH)_2$. Weak peaks in S1 near 27° and 32° indicate the existence of aragonite, which is consistent with FTIR data. Sample labels are defined in Table 1 in the main text.

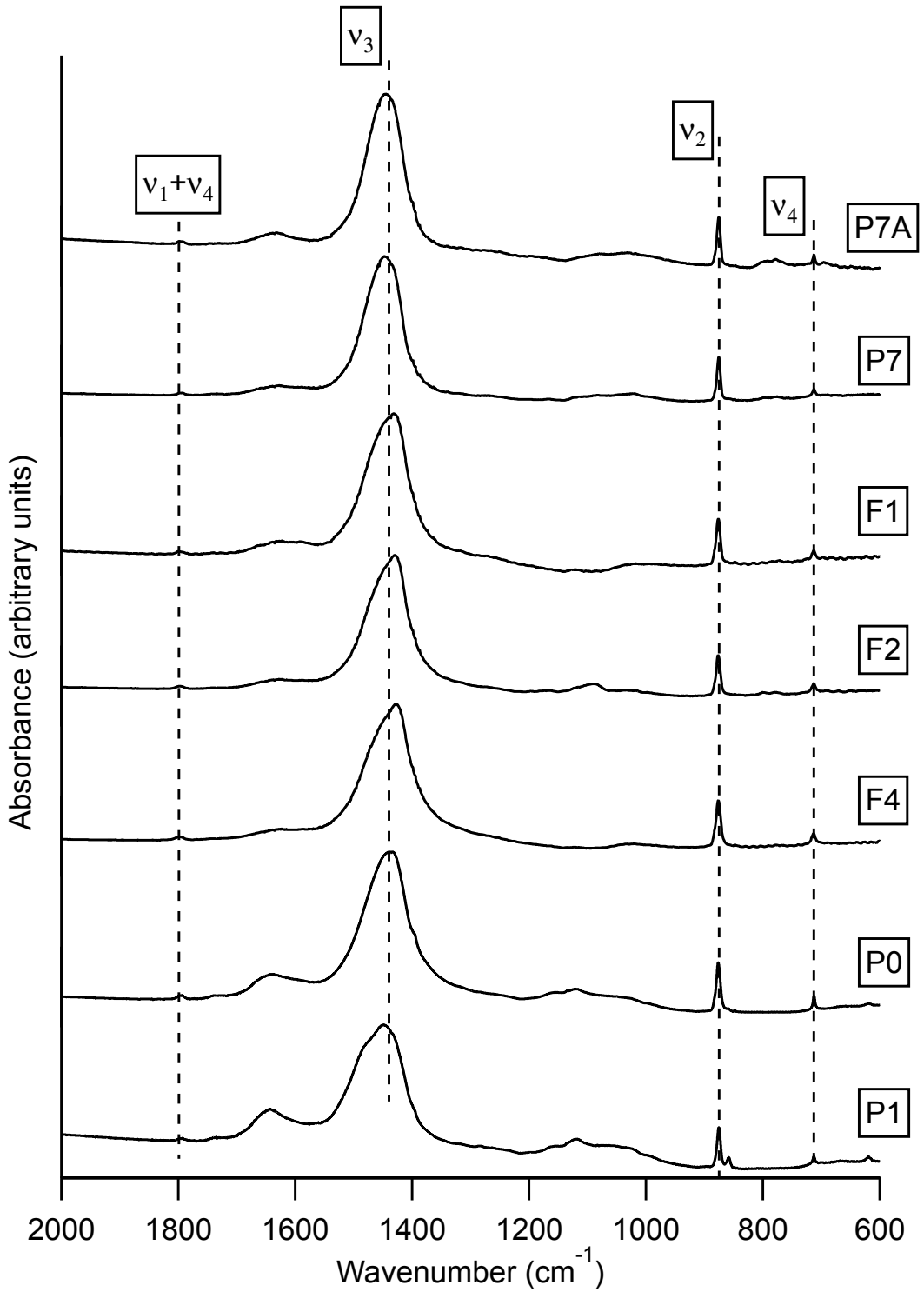

Fig. S2 Representative FTIR spectra compared using absorbance values that are scaled to the largest (ν_3) peak. Normal mode assignments for each peak are made based on literature reports.[11,14,19] The broad peak near 1650 cm^{-1} is from water adsorbed by the KBr matrix during sample preparation. Sample labels are defined in Table 1 in the main text.

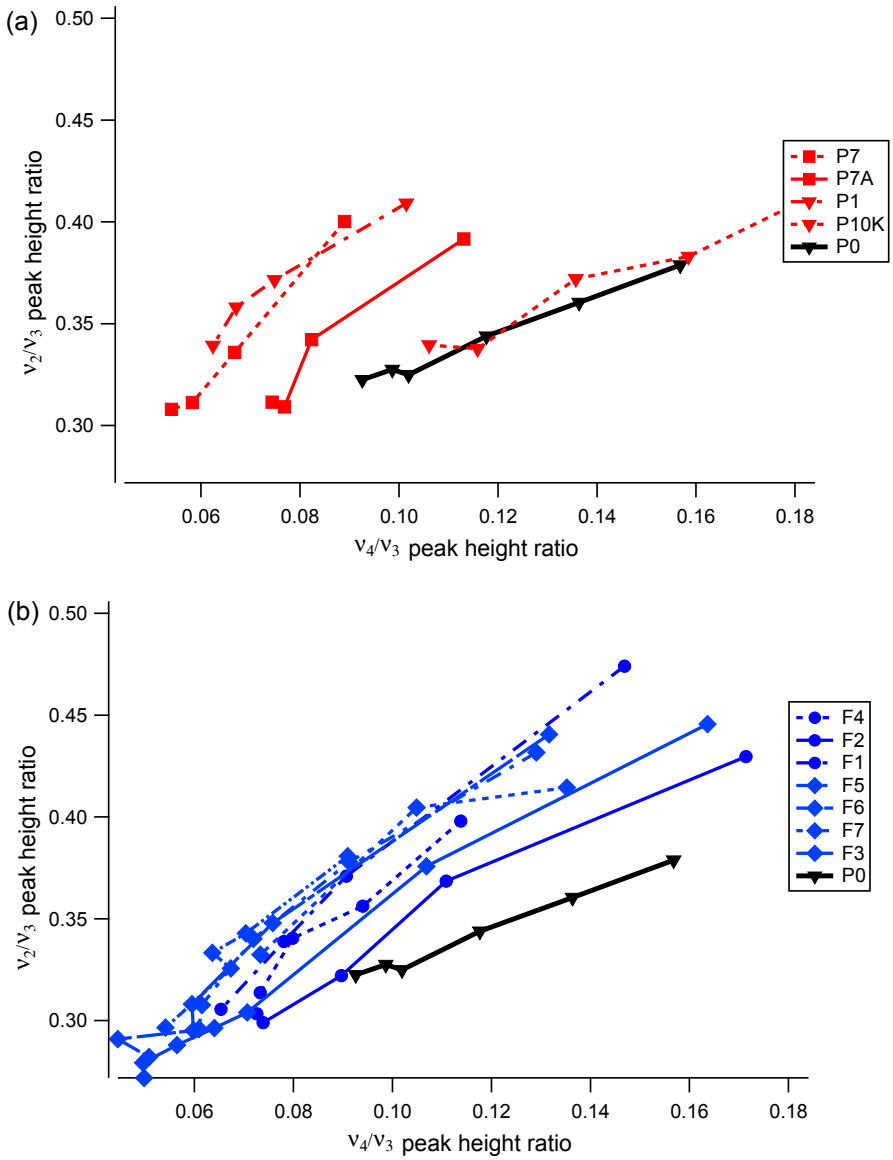

Fig. S3 Grinding curves for all samples. Sample labels are defined in Table 1 in the main text. Color coding differentiates plaster samples (red in (a): P1, P7, P7A, P10K) and flowstone samples (blue in (b): F1-F7) from purchased (synthetic) calcite (black: P0).

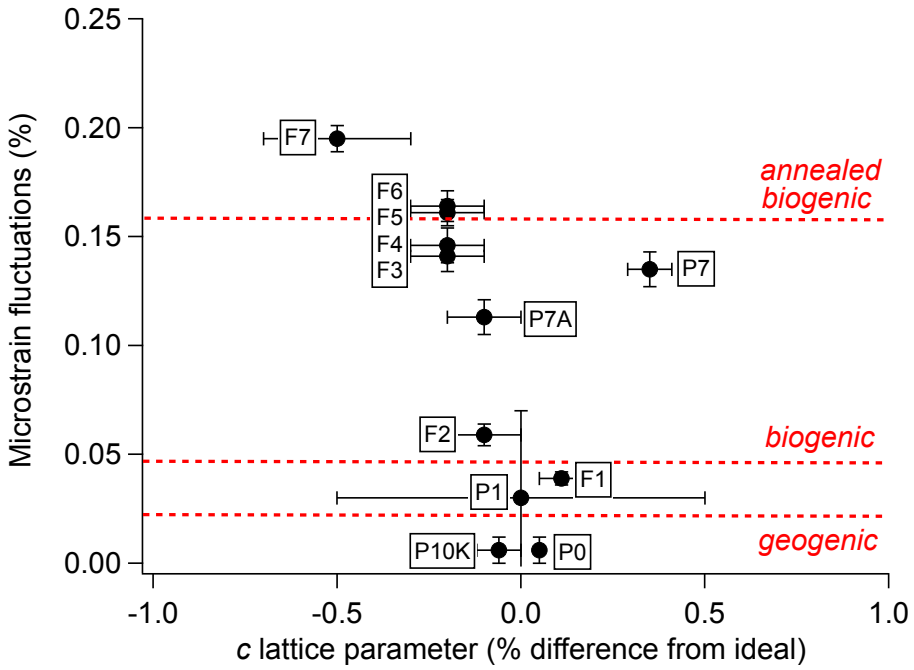

Fig. S4 Comparison of microstrain fluctuation values with *c* lattice constants. Sample labels are defined in Table 1 in the main text. Microstrain fluctuation values can show considerable variation among different samples even when there are no statistically significant differences in their unit cell sizes. The dotted lines indicate approximate microstrain fluctuation values that have been reported for calcite in an earlier report by Pokroy *et al.* [24]