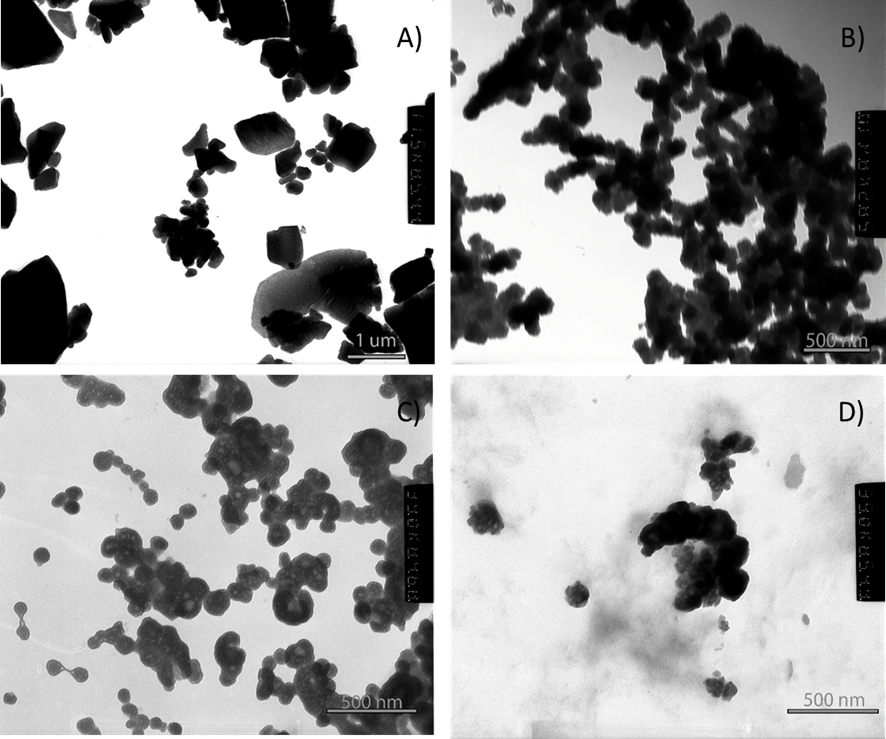
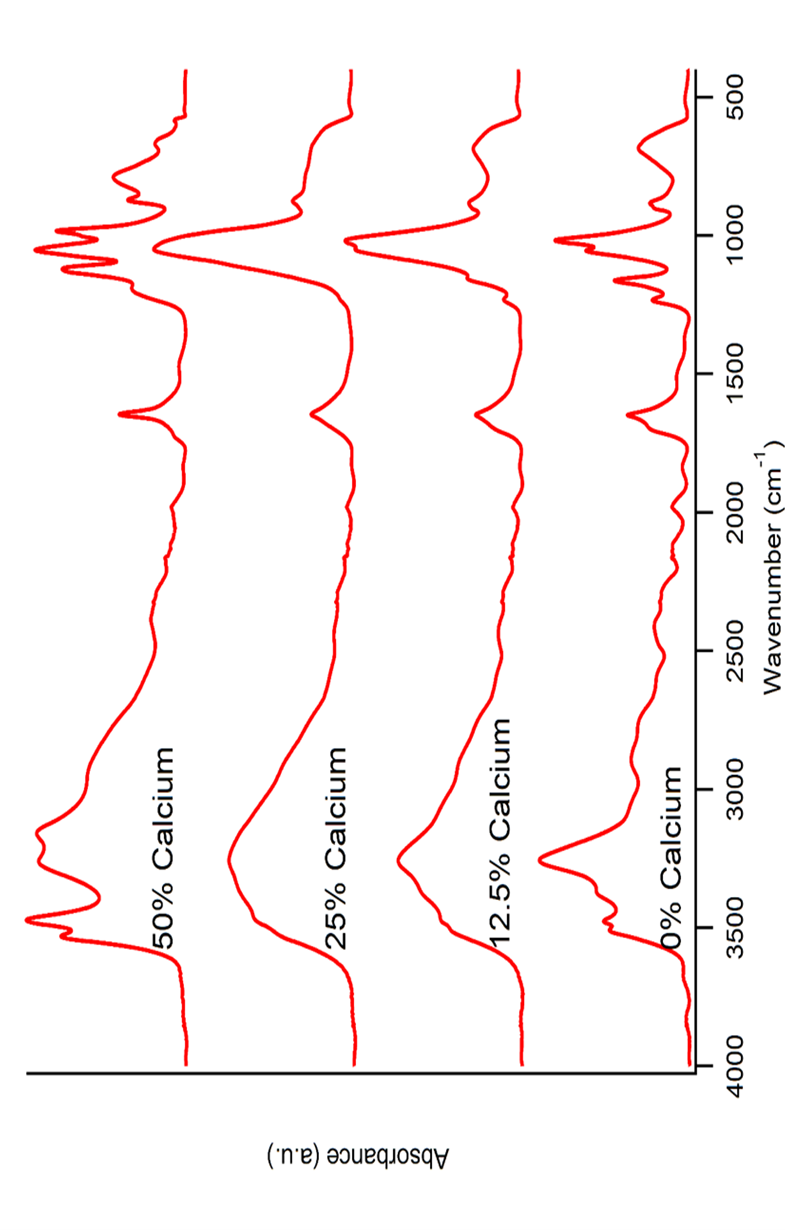
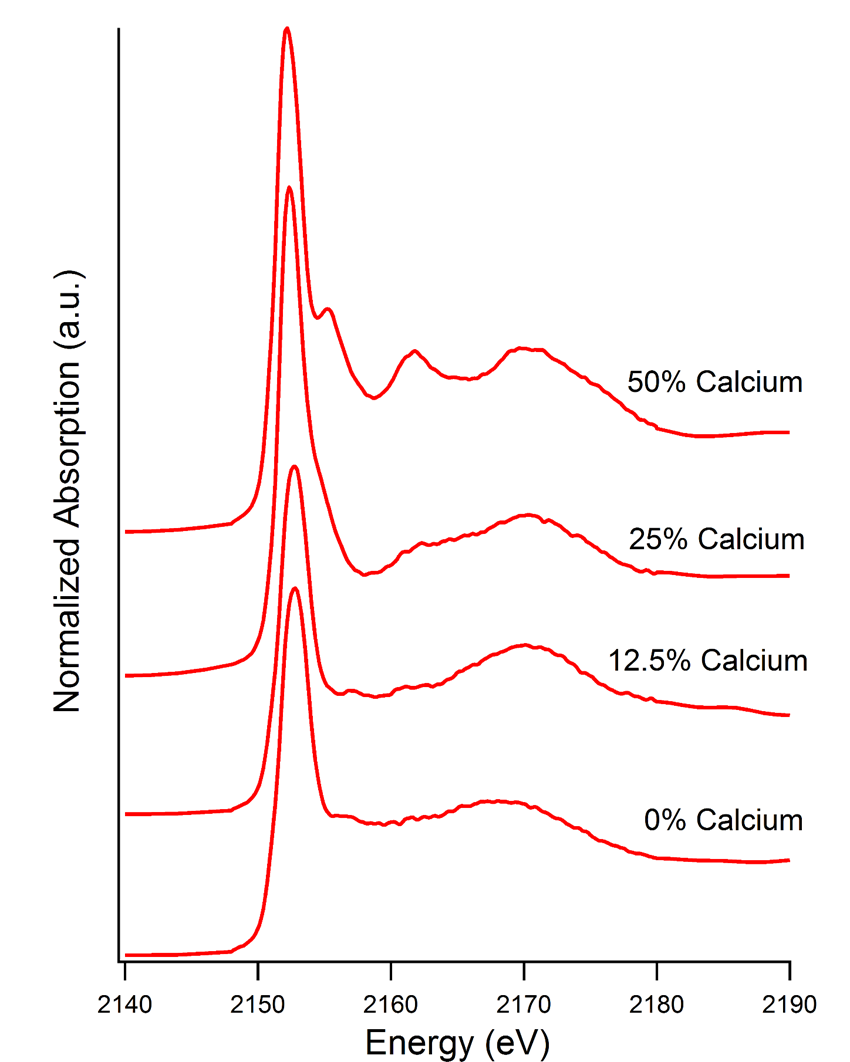
**Appendix A:** Supplemental TEM images, ATR-FTIR spectra, and plotted P K-edge XANES spectra of newberyite minerals series



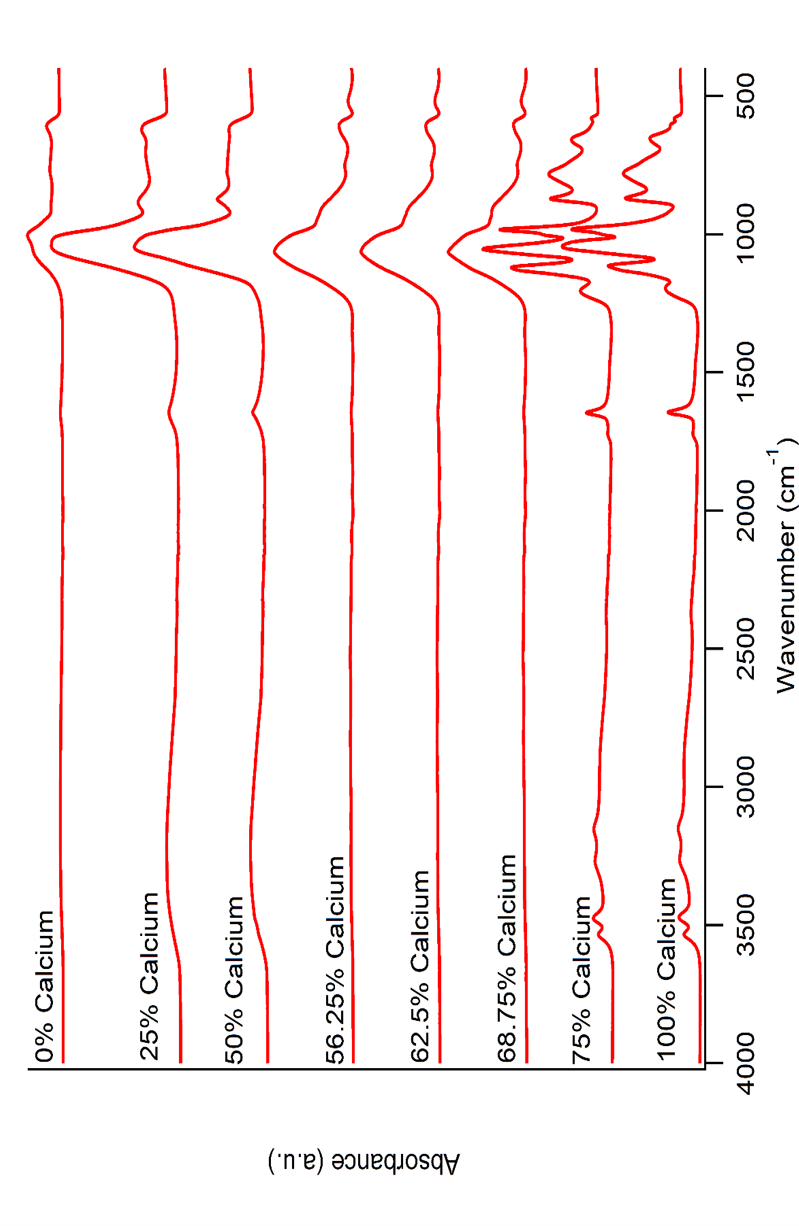
**Figure A1**: TEM of newberyite mineral series where the formation solution occurred in Ca:Mg ratios of A) 0:1, B) 1:8, C) 1:3, D) 1:1.



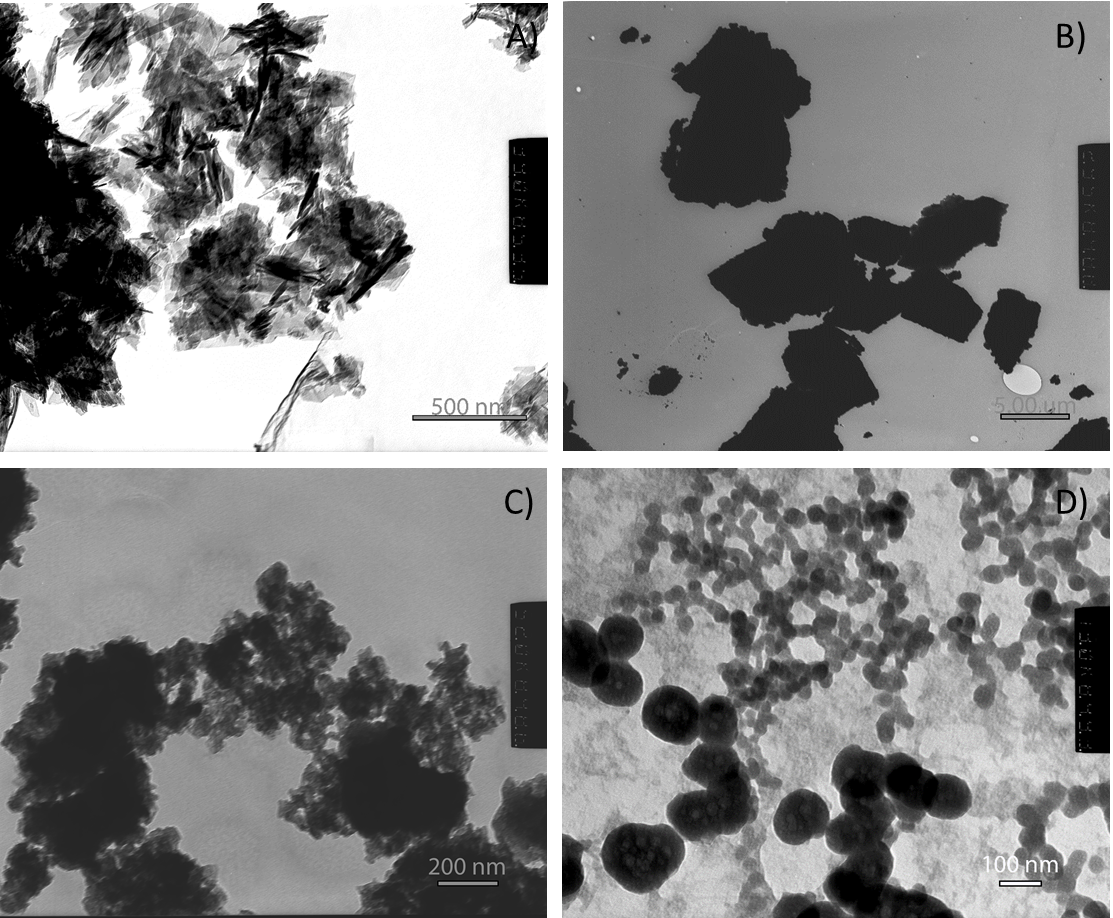
**Figure A2:** ATR-FTIR spectra of newberyite mineral series

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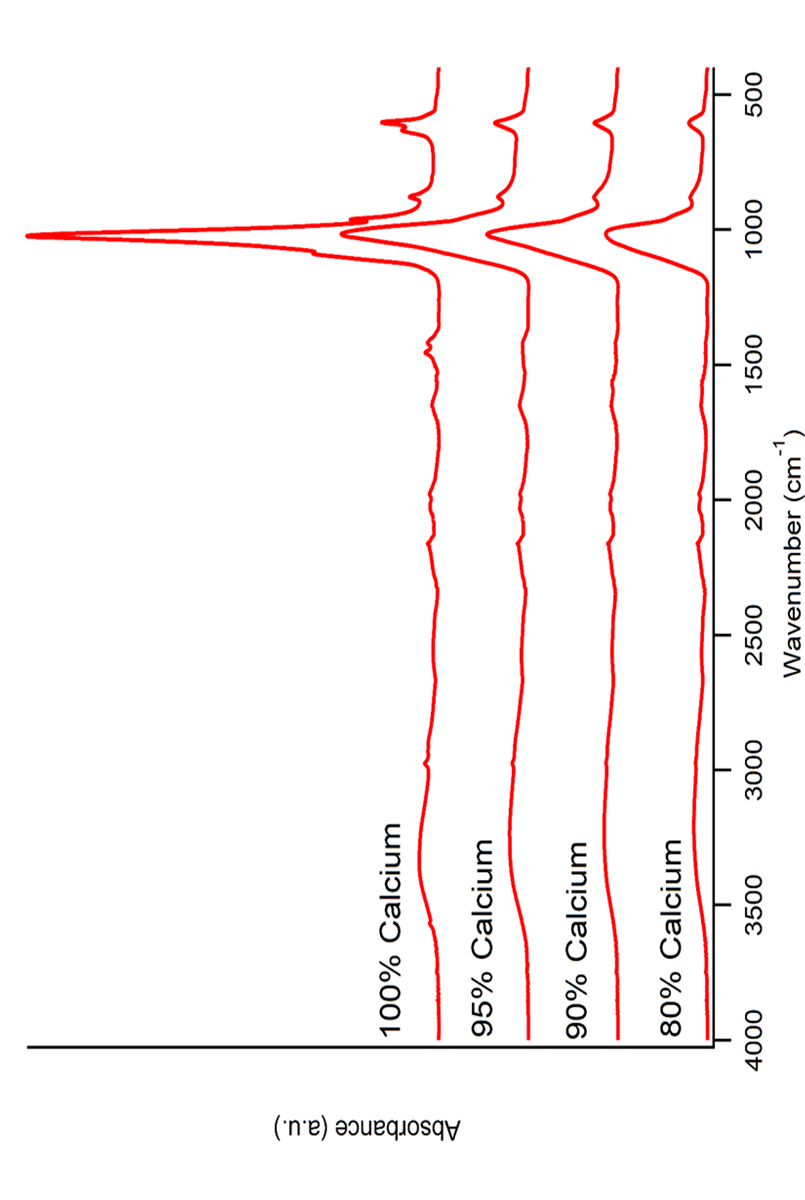
**Figure A3:** P K-edge XANES spectra of newberyite mineral series.

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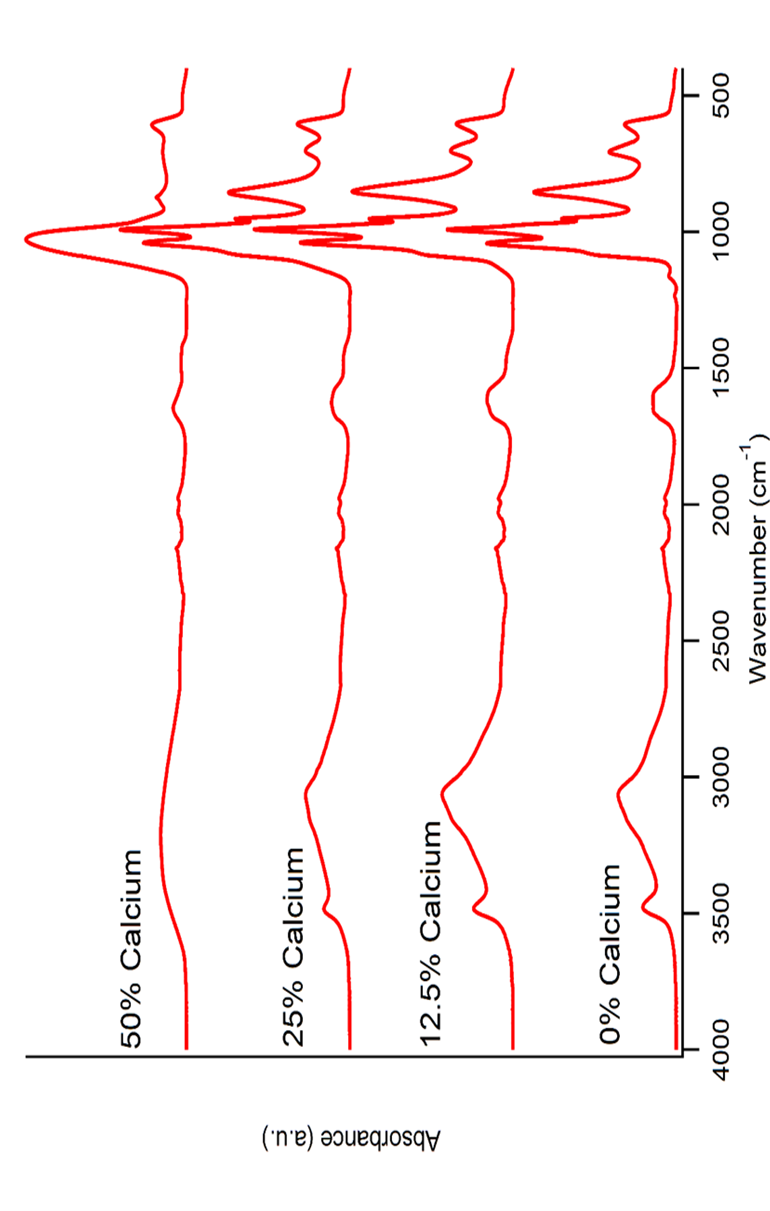
**Figure A4:** ATR-FTIR spectra of brushite mineral series. Note sharp transition between 75% and 68.75% Calcium relative to magnesium in the initial formation solution.



**Figure A5:** TEM of hydroxyapatite mineral series where the formation solution occurred in Ca:Mg ratios of A) 1:0, B) 20:1, C) 10:1, D) 5:1.



**Figure A6:** ATR-FTIR spectra of hydroxyapatite mineral series where the formation solution occurred in Ca:Mg ratios of A) 1:0, B) 20:1, C) 10:1, D) 5:1.



**Figure A7:** ATR-FTIR spectra of bobierrite mineral series where the formation solution occurred in Ca:Mg ratios of A) 1:1, B) 1:3, C) 1:8, D) 0:1.