36-6 - CALCITE MINERALOGY FROM THE NASHUA FORMATION, FORT DRUM, AND FORT THOMPSON FORMATION, NORTH FORT MYERS, FLORIDA. AN NSF GEOPATH AND MRI FUNDED STUDY

Friday, 8 April 2022

8:00 AM - 12:00 PM

Duke Energy Convention Center - Junior Ballroom

Booth No. 46

Abstract

NSF GEOPATH and MRI funding has facilitated the study of calcite samples from the Nashua Fm., Ft. Drum, and the Fort Thompson Fm., North Ft. Myers, Florida. The calcite from Ft. Drum is golden yellow to orange, has radiating rhombohedral crystals, minor scalenohedrons, and fluoresces white to green. The crystals are commonly located inside clam or other fossils. North Ft. Myers calcite are white to buff, are rhombohedral aggregates, some botryoidal growth, and fluoresces white to green. This calcite primarily recrystallized from coral.

Powder X-ray diffraction for samples from both Ft. Drum and North Ft. Myers have 2θ intensity peak positions plotting in agreement with endmember calcite. Single crystal X-ray diffraction revealed an a–axis of 4.999 Å and c–axis of 17.013 Å for a Ft. Drum calcite, and 4.990 Å and 17.000 Å for a North Ft. Myers calcite.

Raman spectrometry wavenumbers of the calcite from Ft. Drum average 154.6 cm^{-1}, 281.2 cm^{-1}, 712.1 cm^{-1} and 1085.8 cm^{-1}. Raman spectrometry wavenumbers of the calcite from North Ft. Myers average 154.6 cm^{-1}, 280.8 cm^{-1}, 712.2 cm^{-1} and 1085.7 cm^{-1}. The first and second peak are associated with the bonds between the CO_3^{2-} anion and the Ca^{2+} cation. The third and fourth peaks, the final being the highest intensity, are representative of the bonds within the CO_3^{2-} anion.

EPMA analysis conducted at the Florida Center for Analytical Electron Microscopy, FIU, on 14

EPMA analysis conducted at the Florida Center for Analytical Electron Microscopy, FIU, on 14 Ft. Drum and 14 North Ft. Myers samples display they are close to endmember calcite (X_{Cal} = 0.987 – 0.999). The Sr and Mg for Ft. Drum samples average 233 ppm and 843 ppm respectively, and plot near abiotic marine calcite values. While the Sr and Mg from North Ft. Myers average 836 ppm and 3243 ppm respectively, and trend towards biotic marine calcite values. Fe^{2+} and Mn^{2+} are scarce indicating minor replacement for Ca^{2+}.

The 2θ, unit cells, Raman wavenumbers, and X_{Cal} are all within the expected values for endmember calcite. Ft. Drum calcite precipitated inside of marine fossils and is not the result of the fossils recrystallizing. This is supported by the Sr and Mg compositions being similar to abiotic marine calcite. North Ft. Myers calcite are recrystallizing from marine fossilized corals. This is supported by the Sr and Mg compositions trending towards biotic marine calcite. Mg may be causing the fluorescence in all samples.

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***Claire McLeod**, Department of Geology and Environmental Earth Science, Miami University, Oxford, OH, **Ken Brown**, Department of Geosciences, DePauw University, Greencastle, IN, **James MacDonald Jr.**, Environmental Geology Program, Florida Gulf Coast University, Fort Myers, FL, **Preston Phillips**, Undergraduate Research, Scholarship and Creativity Office, University of North Carolina at Greensboro, Greensboro, NC and **Jeffrey Ryan**, School of Geosciences, University of South Florida, Tampa, FL*

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