
7-16 - DIAGENESIS OF A PYRITIZED CONTACT AT THE MIDDLE TO LATE DEVONIAN TRANSITION FROM CARBONATE TO BLACK SHALE IN THE MICHIGAN BASIN



Sunday, 21 April 2024



1:30 PM - 5:30 PM



Grand Ballroom, Oasis CC (Oasis Hotel & CC)

Booth No. 21

Abstract

Petrographic analysis can reveal information about original depositional environments and subsequent diagenetic conditions. Here we examine a well-developed pyritized interval at the contact between the Traverse Limestone (a fossiliferous dolomitic packstone) and the “Squaw Bay Formation” in the Michigan Basin. Overlying the pyritized discontinuity, the “Squaw Bay Formation” is a calcareous, highly bioturbated shale, indicating Devonian sea level rise and/or basin subsidence. Little prior petrographic analysis has been done on these formations, and, given the stratigraphic consistency of the pyritized interval across geographically diverse cores, detailed petrographic study will elucidate the diagenetic history of each formation and the contact itself.

Ten thin sections were cut from three cores with samples taken at the contact and in both the underlying Traverse Limestone and overlying “Squaw Bay Formation”. Thin section petrography, SEM, and μ XRF technologies are used to delineate diagenetic overprints and stratigraphic relationships. Analysis revealed extensive dolomitization of the Traverse Limestone and a variable history of fossil recrystallization in the “Squaw Bay Formation”. The presence of chalcedony, glauconite, various forms of calcite, and several crystal morphologies of pyrite at and near the contact imply a complicated diagenetic history. The nature of the calcite and pyrite generations in these samples contextualize the diagenetic history of each formation and of the contact. Calcite crystals, overgrowths, and deformations distinguish the Traverse from the “Squaw Bay,” and suggest multiple and distinct generation events. The pyrite at the contact exhibits both cubic and needle-like forms. Future SEM analyses may reveal whether the needle-like form is a result of a second generation of sulfide mineralization or diagenetic alteration of the original pyrite. Continued research will result in the development of a paragenetic sequence for this mineralized stratigraphic contact.

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