OCRWM Office of Science and Technology and International

Phase analyses of uranium bearing minerals from the Nopal I Deposit, Peña Blanca, Mexico

Presented to:
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Presented by:

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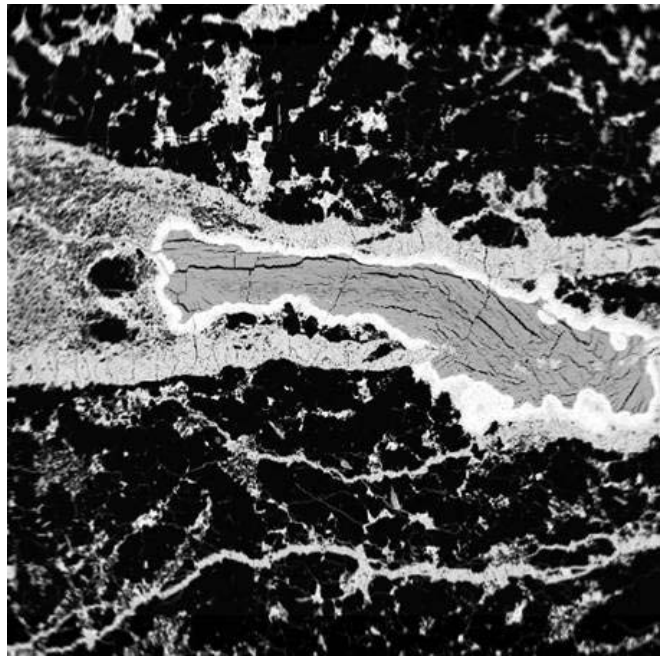
Objectives

- Characterize Nopal 1 and Prior High-Grade Stockpile (PHGS) source material

[redacted]

- Characterize the major uranium phases
- Paragenesis, zoning, relative timing of uranium phases in Nopal 1



Samples

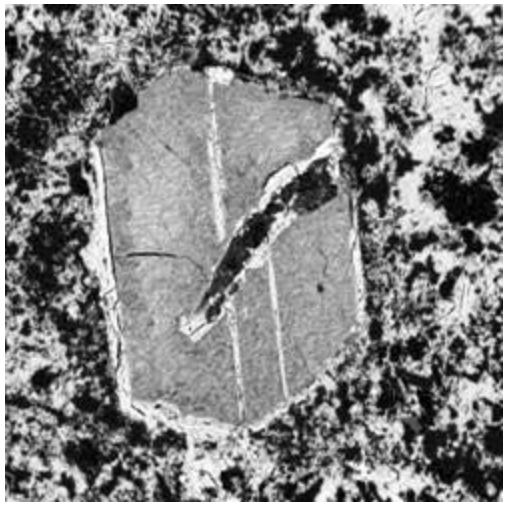
First sets of samples were collected from the mined outcrop

Samples

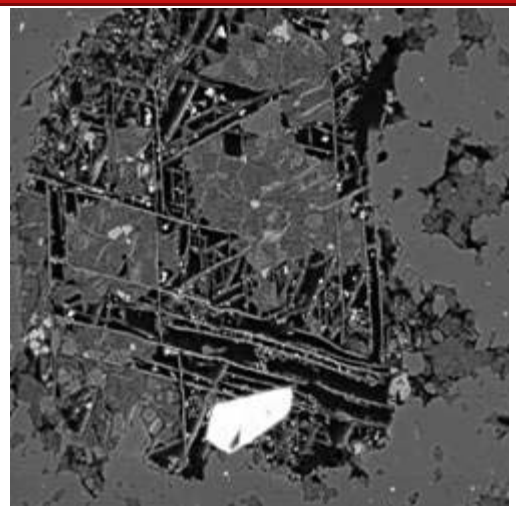
Source rock for prior high grade stockpile

Petrographic

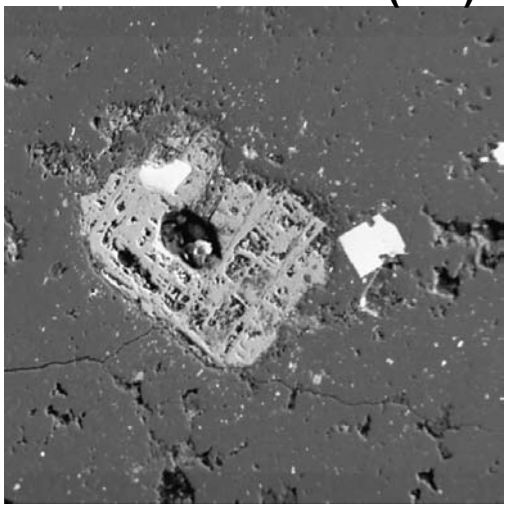
- Altered Fe-Ti phase



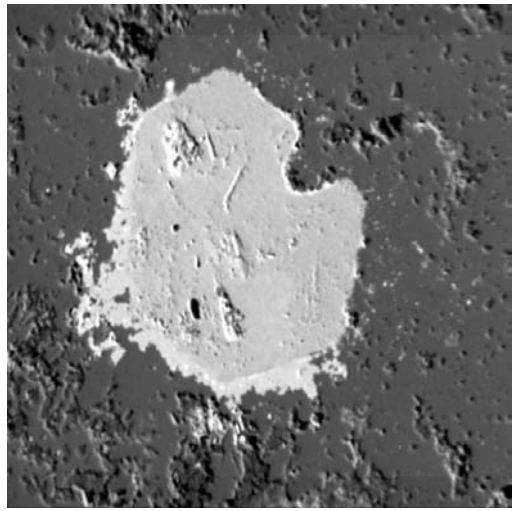
Uraniferous pseudomorph of ilmenite (ilm)



Leached ilmenite skeleton

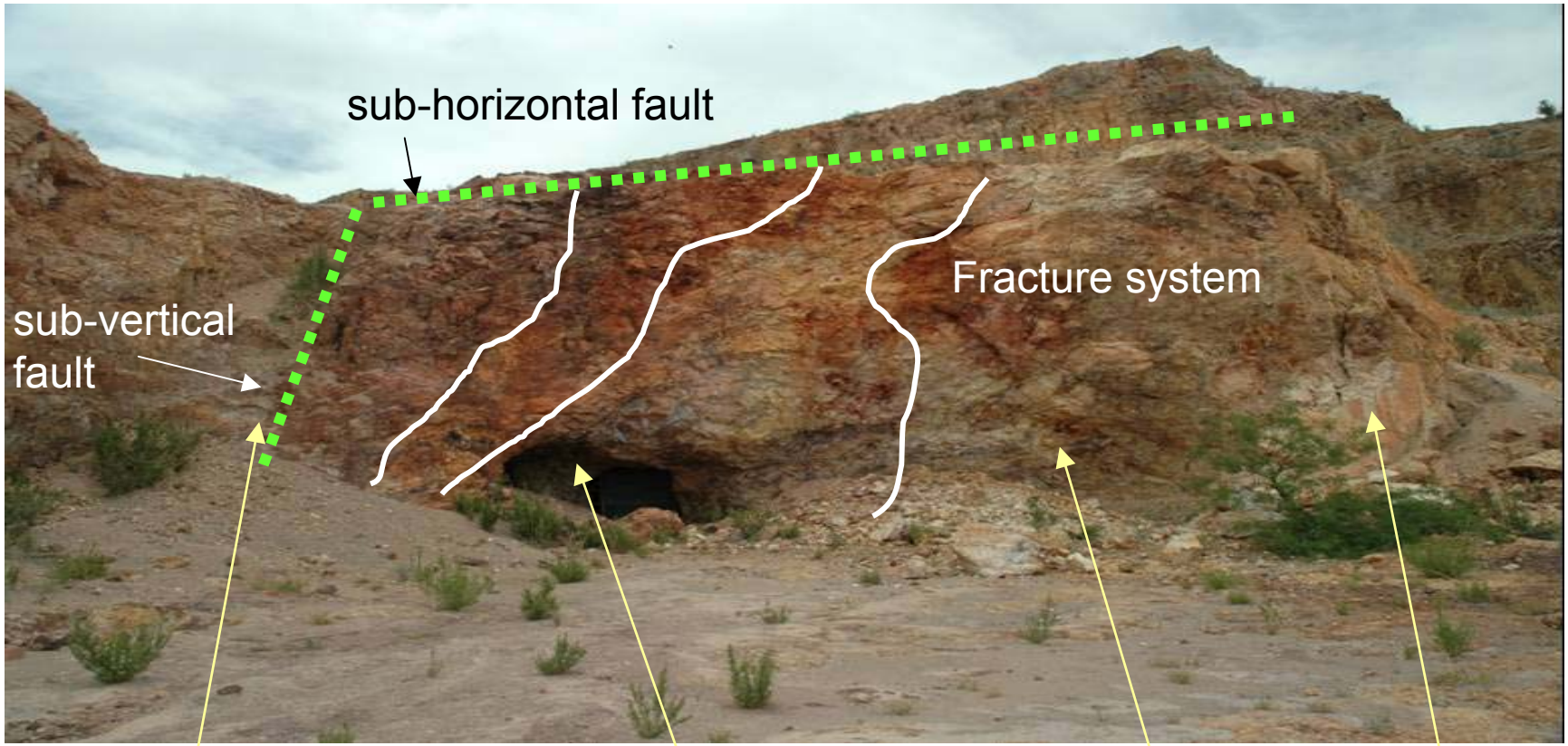


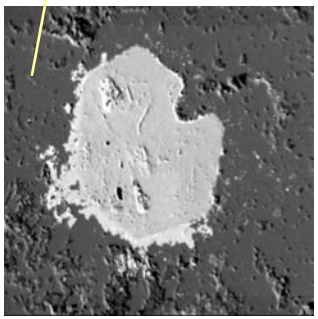
Less altered ilmenite

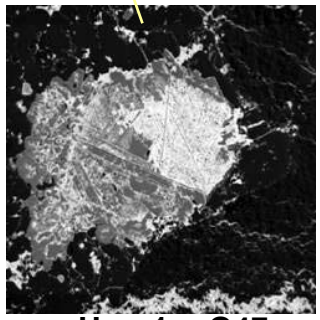


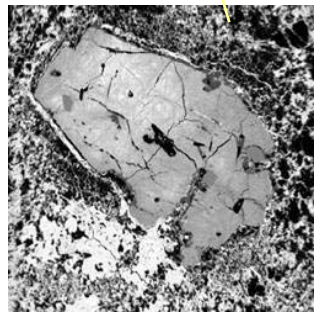
Fresh ilmenite

Fe-Ti phase




325 – Q28


Uran1 -- Q47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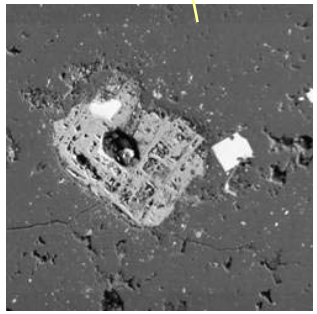
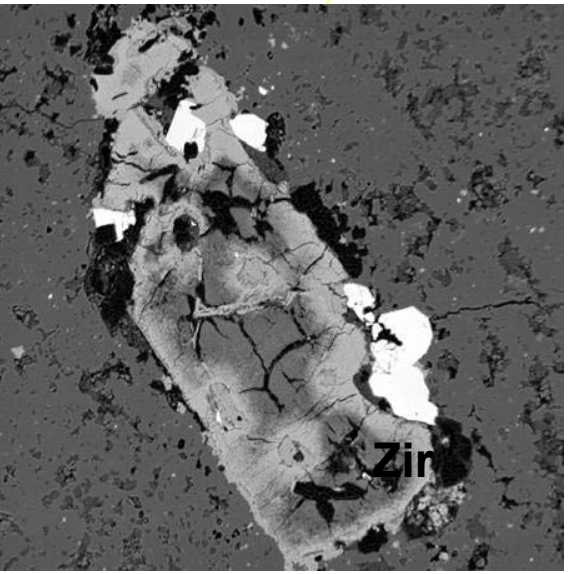
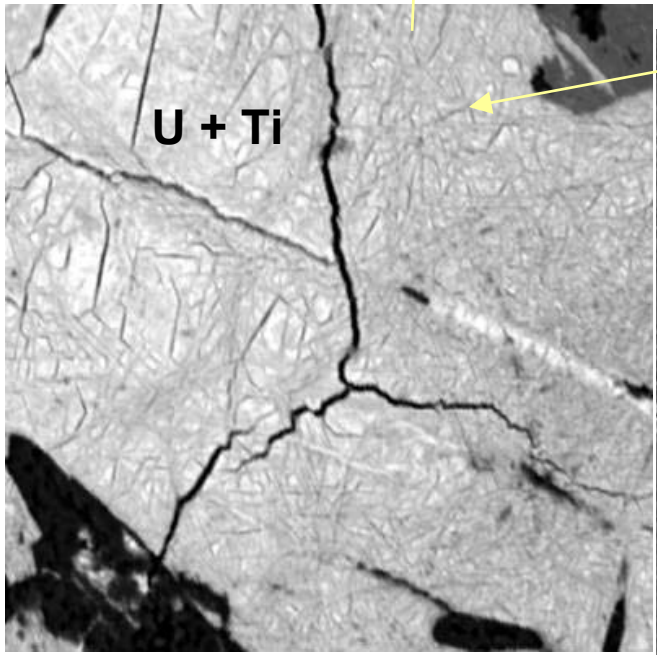

310 – Q12

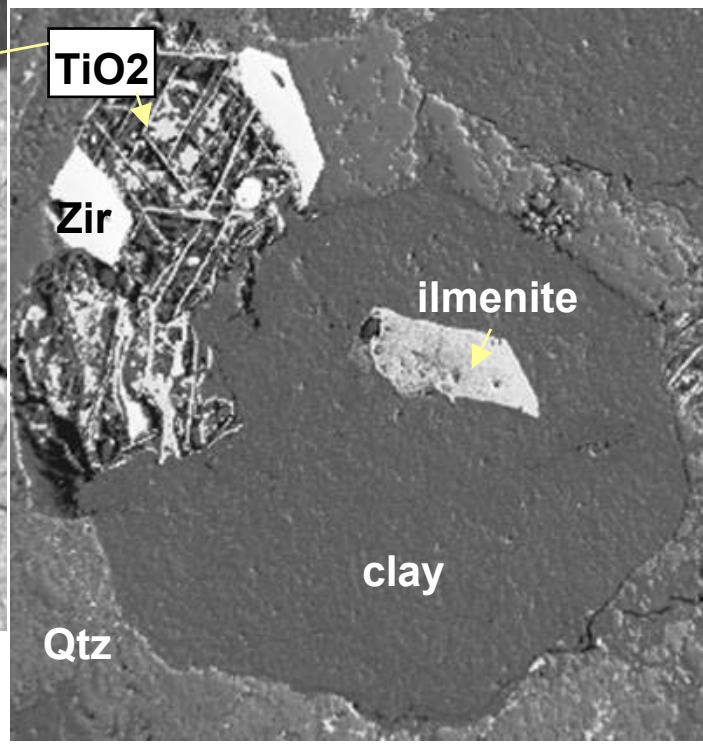
Altered Fe-Ti phase



ilmenite with altered center



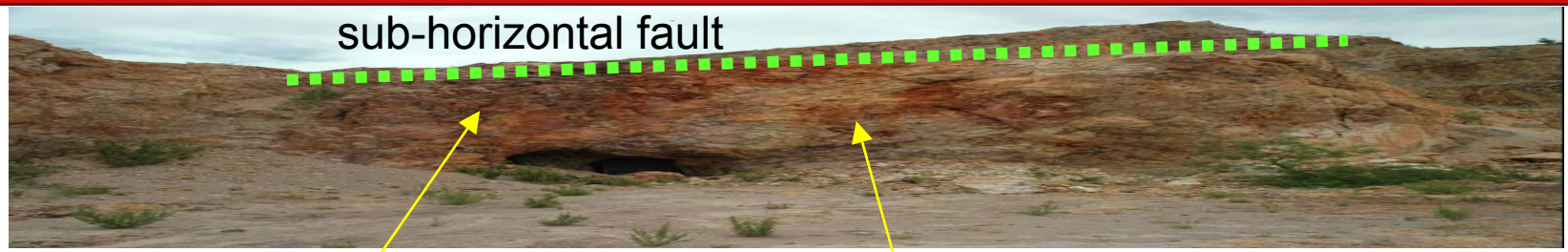
Uraniferous pseudomorph of ilmenite

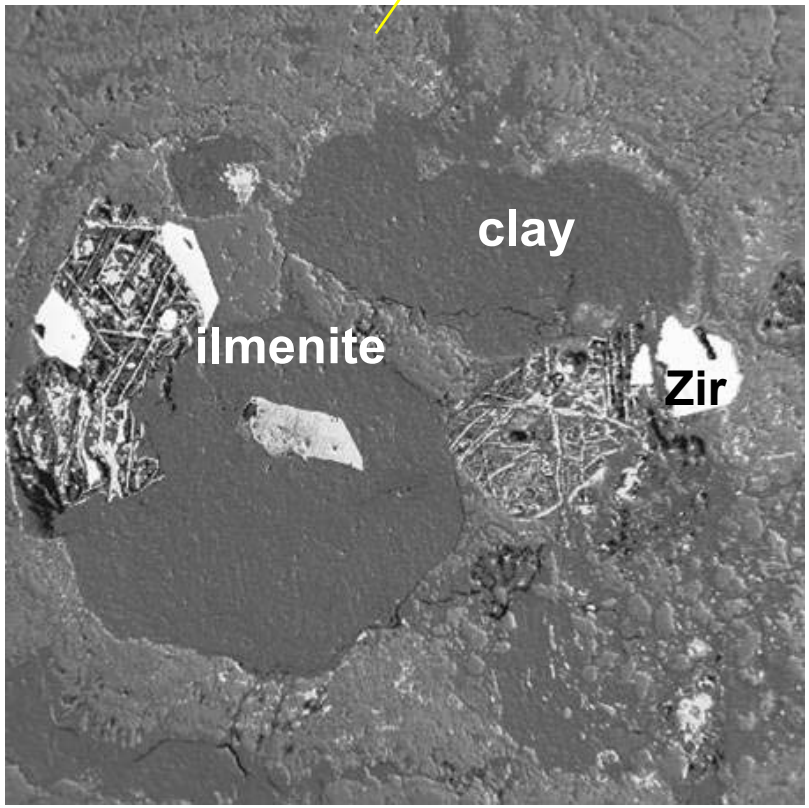


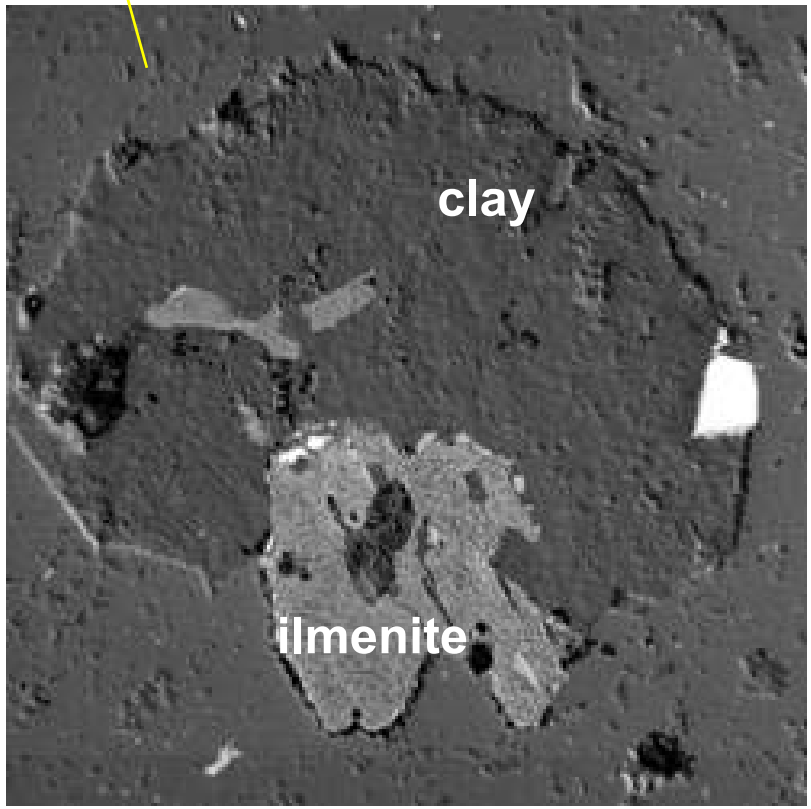
Leached ilmenite skeleton

Zir-zircon, Qtz-quartz

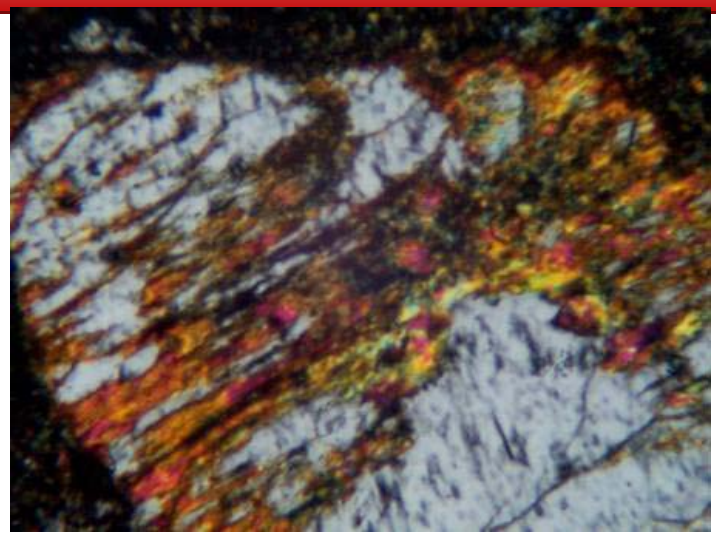
Altered feldspar





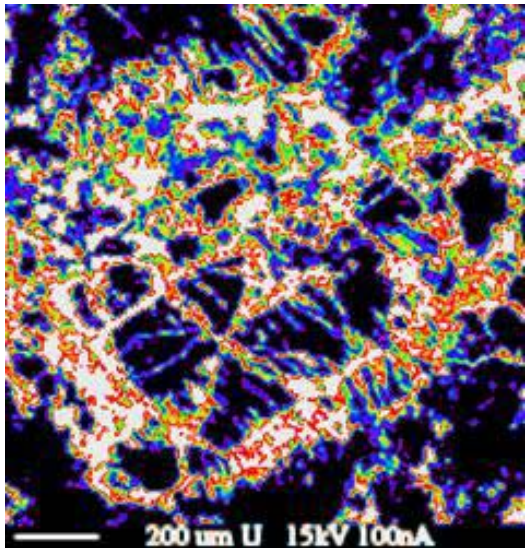


Feldspar

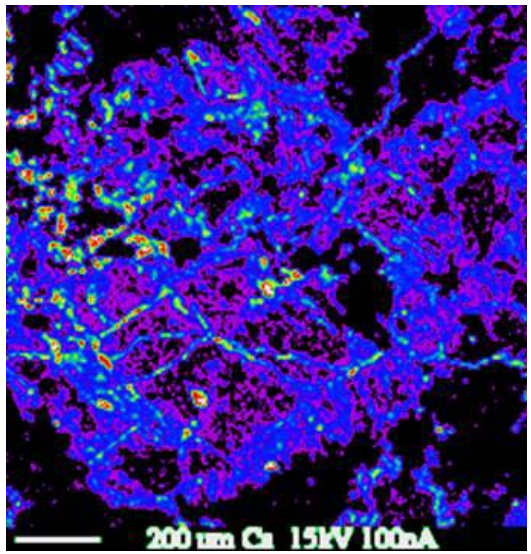


- Feldspar

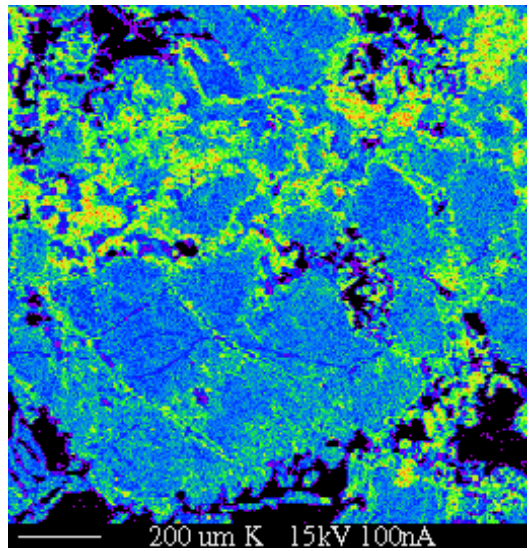
Cross-polarized, transmitted light



U x-ray map

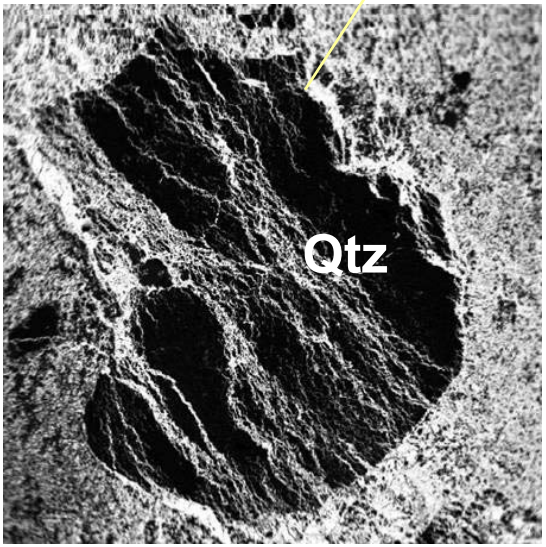


Ca x-ray map



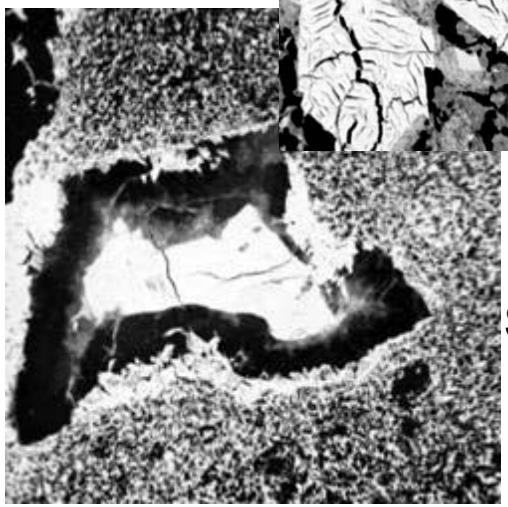
K x-ray map

Uranium phases

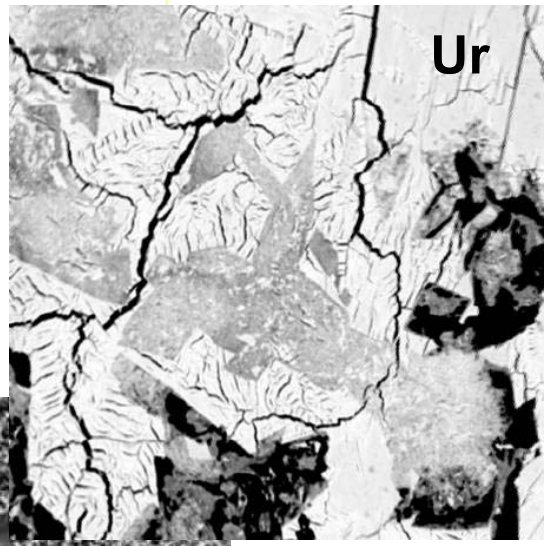


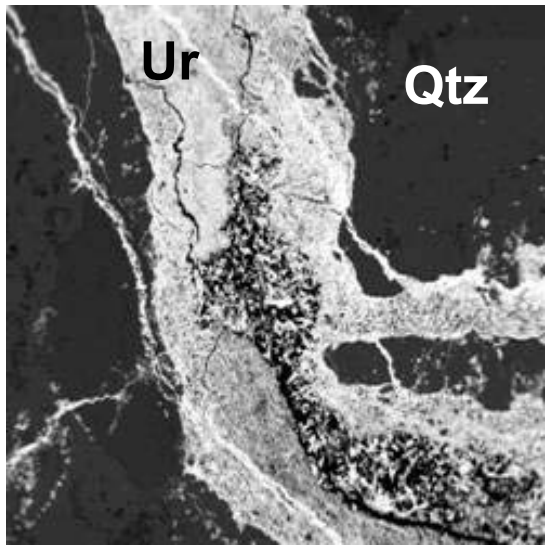
Uranium phases

vein filling



Substituting other minerals

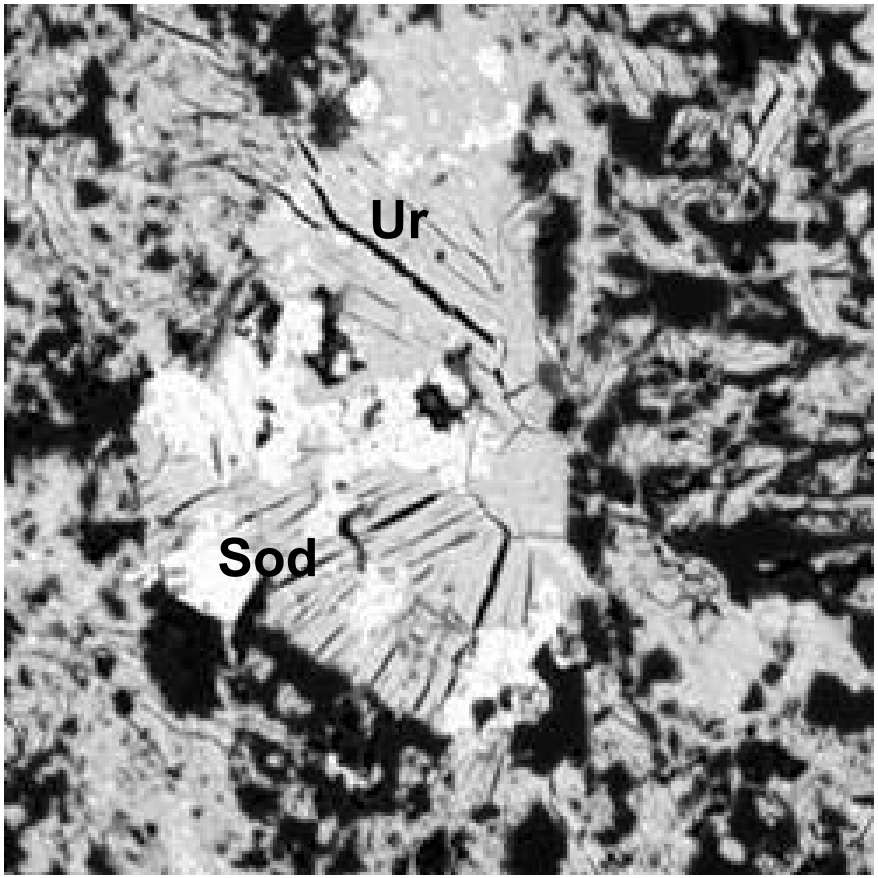


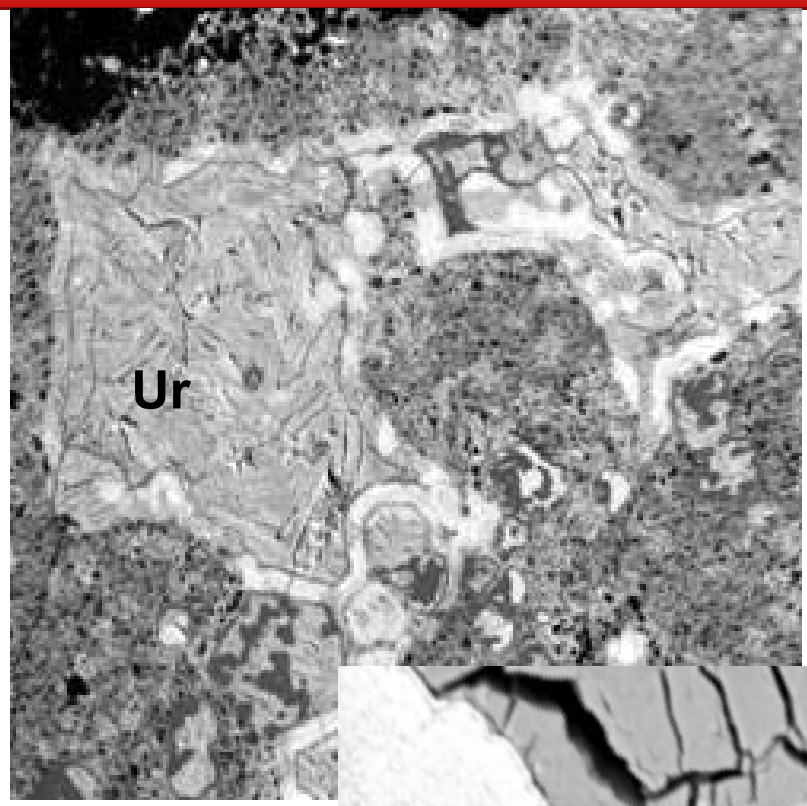


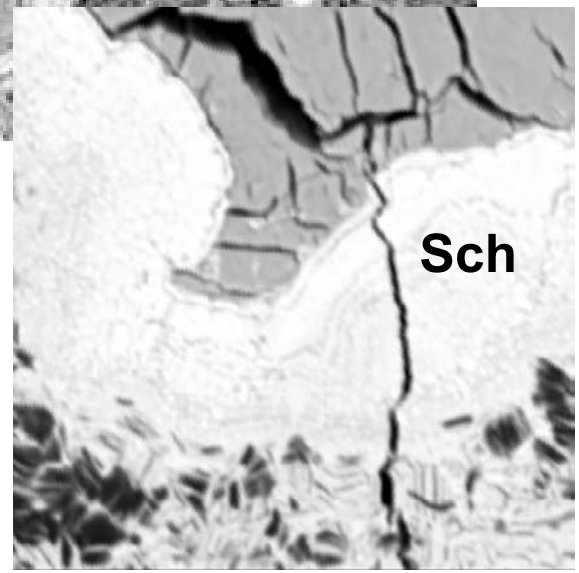
vein filling

Ur-Uranophane

Uranium phases



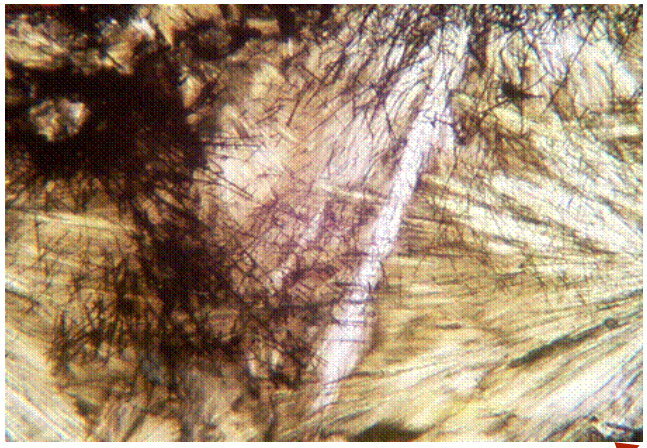




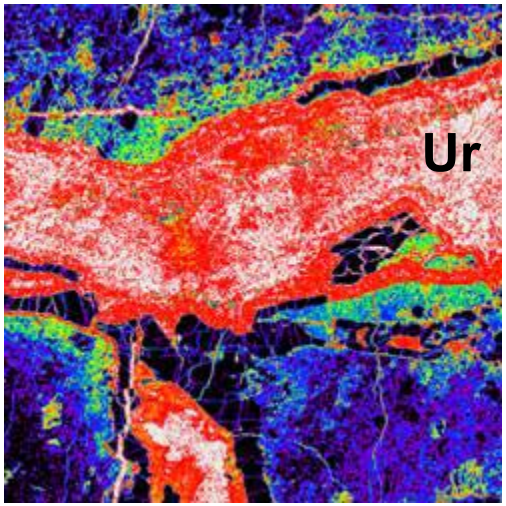
Ur-Uranophane,
Sod-Soddyite,
Sch-Schoepite

Uranium phases

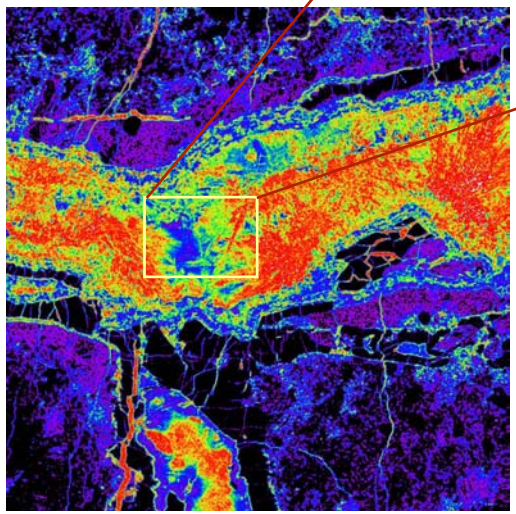
- U phases from ore boulder



Transmitted light

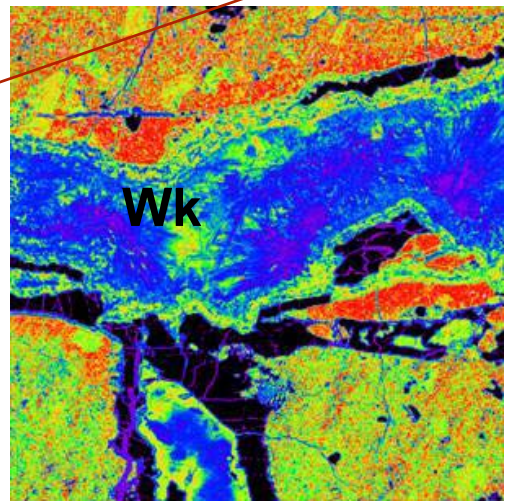


U x-ray map



Ca x-ray map

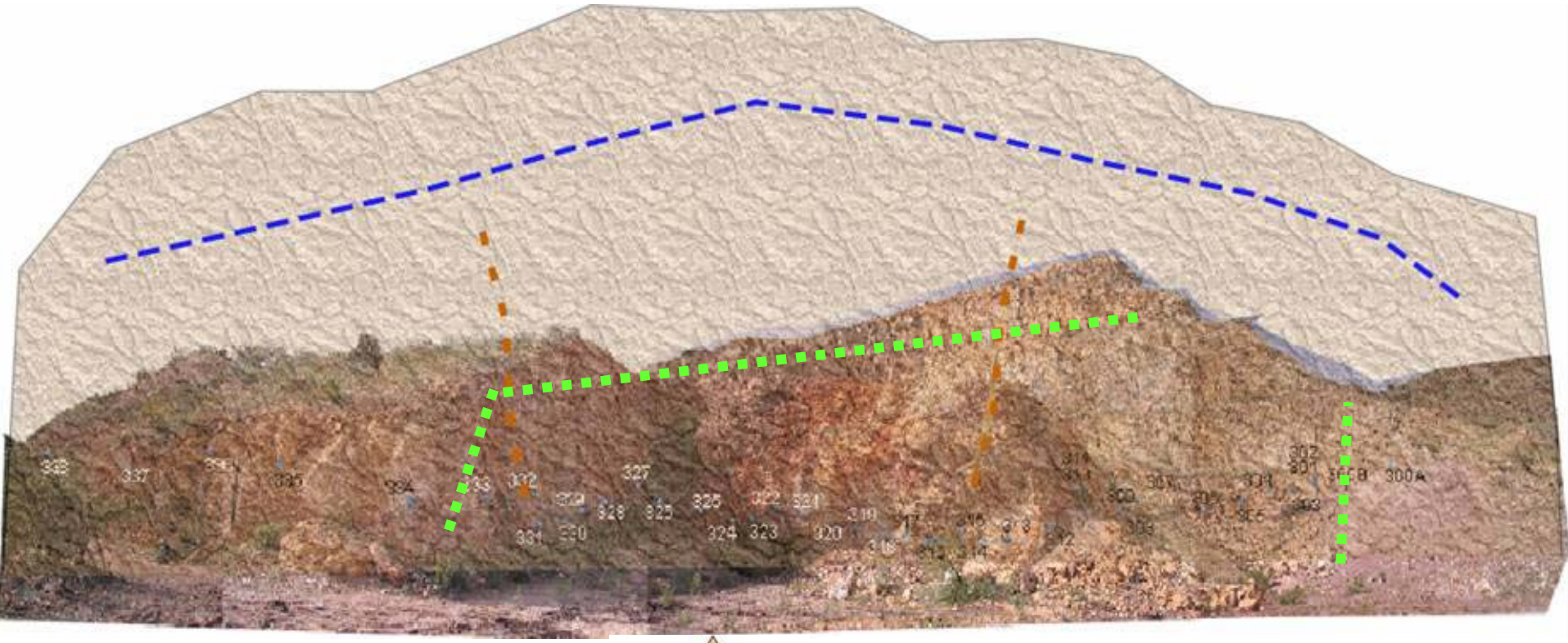
Ur - uranophane



K x-ray map

Wk – weeksite

Paragenesis and zoning



less altered

More altered

Inferred zonation of feldspar alteration

Leaching fluid moving

altered Fe-Ti phase zone

fault

Conclusions

- Quartz-pyrite-uraninite replaced by secondary uranium phases: schoepite, uranophane, weeksite, and soddyite.
- Hydrothermal alteration (leaching) is controlled by the fracture zones.
- Fe-Ti phases (ilmenite) are more altered in the center part of fracture zone, and uranium phases can replace the altered ilmenite.
- Feldspar from the outcrop exposure is totally altered, but is less altered in the boulder from PHGS, which represents the rocks removed from above the existing exposure.

Acknowledgement

- The project is funded by the U.S. Department of Energy, Office of Civilian Radioactive Waste Management, Office of Science & Technology & International

Questions?