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Deep Borehole Field Test - Site Geosciences Integration

David Sassani

Sandia National Laboratories

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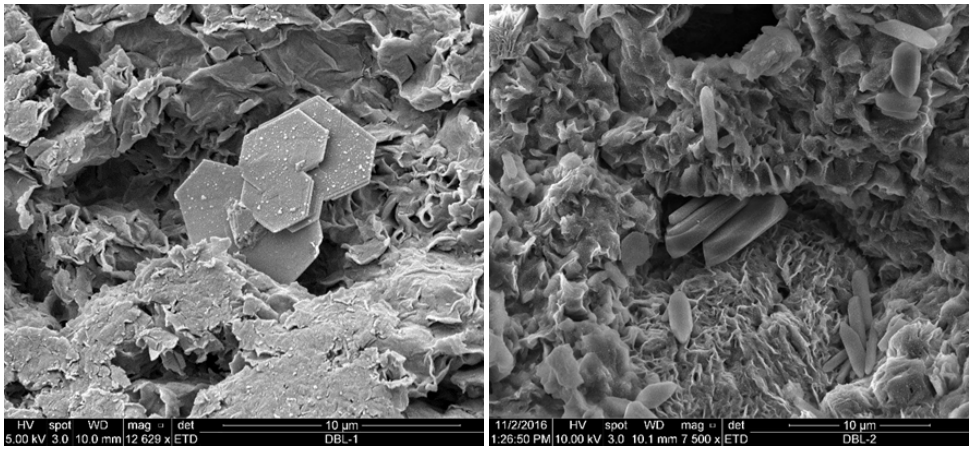
Deep Borehole Field Test – Site Geosciences Integration

- **Objectives for DBFT Site Geoscience**
  - Support the DOE procurement and contracting process
  - Integrate existing geoscience data with DBFT collected data
    - *Evaluate thermal-hydro-mechanical-chemical (THMC) conditions at depth*
- **Accomplishments**
  - Supporting four contracts awarded by DOE (Phase 1)
    - *AECOM - Texas (Pecos Cty) - http://www.texasdbft.com/*
    - *ENERCON - New Mexico (Quay Cty) - http://dbftscientific.com/*
    - *RE/SPEC - South Dakota (Haakon Cty). - https://drilldeepersd.com/*
    - *TerranearPMC - New Mexico (Otero Cty) - https://saltbasinproject.com/*
  - Geologic framework model (GFM: F. Perry, R. Kelley, LANL)
    - *Example GFM*
    - *Available data for sites*
  - Analyses for generic fluid-rock reaction systems in crystalline basement
    - *Evaluate mechanisms in the crystalline basement to form deep, isolated brines*
      - Reaction path models for granite mineral reactions with seawater
        - ***Alteration mineralogy – hydrous phases (H_2O sinks)***
        - ***Evolved brine compositions (major elements, Cl, Br)***
      - Fluid inclusion contributions (soluble salts)
      - Calculating leachate compositions from Black Forest crystalline basement rocks

Deep Borehole Field Test – Site Geosciences Integration (Cont'd)

- **Accomplishments (Continued)**
  - Experiments on seals materials (F. Caporuscio, K. Norskog, LANL)
    - *3 separate runs: 8 weeks in Rocking Autoclaves*
      - 2 molal NaCl; $CaCl_2$; and
      - 2 molal Cs-Ca-NaCl equimolar
    - *150°C and 300 bar*
    - *Growth of Pyrrhotite and Prehnite*



  - Co-convened/organized Goldschmidt 2017 Session (Paris, France, Aug. 13-18)
    - *19d: Mineralogy and Geochemistry for the Safe Management of Nuclear Waste*
      - A. Navrotsky - Keynote Speaker
      - 23 oral presentations (morning and afternoon)
      - Poster session (evening)
      - Co-conveners: S. Finkeldei (Fz-Juelich), F. Heberling (KIT)
    - *Abstracts*
      - *Clay Seals Mineralogy in Deep Borehole Repository. (*Caporuscio, Norskog, & Jove-Colon)
      - *Fluid-Rock Processes Driving Isolation of Crustal Fluids in Crystalline Basement Systems*. (Sassani, Brady, Kuhlman, Jove-Colon, & Lopez)

DBFT Site Geosciences: Outlook Remainder of FY17

- **Site Geoscience Data Evaluation- SF-17SN01030604**
  - Continue support to the DOE procurement and contracting process for 4 sites
    - *Phase 2 (permitting)*
  - Complete generic thermochemical fluid-rock reaction analyses
    - *Evaluate reaction rates vs fluid flux/transport rates (diffusive/advective)*
  - Geologic framework model prototype
  - Experiments on seals materials
  - Goldschmidt 2017 (August)
  - Milestones
    - ***9/15/2017*** *- Integrated Geoscience Data and Evaluation of Geologic Conditions for DBFT Site (M2SF-17SN010306041)*
    - *7/28/2017 - Geologic Framework Model for the Deep Borehole Field Test (LANL M4)*
    - *8/25/2017 - Hydrothermal Experiments on DBFT Seal Materials (LANL M4)*