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Opportunity Title: Evolution of planetary crusts
Opportunity Reference Code: 0017-NPP-MAR23-JSC-PlanetSci

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0017-NPP-MAR23-JSC-PlanetSci

How to Apply All applications must be submitted in Zintellect

Application Deadline 3/1/2023 6:00:00 PM Eastern Time Zone

Description **Description:**

The story of a planet's evolution is written in the geochemical signatures of its crust. Earth's primary crust and ancient history has been erased by active plate tectonics and eroded by wind and water. Differentiated planetary bodies without plate tectonics or atmospheres best preserve the geochemical evidence of ancient crust formation and evolution in addition to providing insight regarding the early Earth.

This research theme focuses on understanding the evolution of planetary crusts with perspective rooted in sample science (e.g., Apollo samples and lunar meteorites, martian meteorites, achondrites). My work then integrates experimental petrology, orbital mission data, and geophysical modeling to reconstruct the earliest history of planetary surfaces and their transition to secondary and tertiary crust building. Investigations are conducted within the Astromaterials Research & Exploration Science (ARES) Division at NASA Johnson Space Center, which is home to many microanalytical instruments in both the Coordinated Analysis Laboratory (including the JEOL 7900F SEM and JEOL 8530F electron microprobe) and the mass spectrometry laboratories in the Center for Isotope Cosmochemistry and Geochronology (including in situ trace element and isotopic analysis via LA-MC-ICPMS). The Experimental Petrology suite in ARES houses multiple Deltech 1-atm gas-mixing furnaces for conducting both isothermal and controlled cooling experiments at relevant planetary redox conditions.

Some example topics include planetary geothermometry, synthesis of planetary materials for reflectance spectroscopy studies with application to orbital remote sensing data, and constraining the processes involved during the initiation of secondary crust building on the Moon.

Prospective candidates with mutual interests in this research theme are encouraged to reach out and identify potential projects. Due to the integrative approach to this research, collaboration with other NPP principal investigators residing in ARES is also encouraged.

Field of Science: Planetary Science

Advisors:

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Eligibility is currently open to:

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- U.S. Citizens;
- U.S. Lawful Permanent Residents (LPR);
- Foreign Nationals eligible for an Exchange Visitor J-1 visa status; and,
- Applicants for LPR, asylees, or refugees in the U.S. at the time of application with 1) a valid EAD card and 2) I-485 or I-589 forms in pending status

Qualifications

Eligibility Requirements

- **Degree:** Doctoral Degree.