

**Report for the Joint Use/Research of the Institute for Planetary Materials,
Okayama University for FY 2024**

Month/Day/Year

Category: ☒ International Joint Research ☐ General Joint Research ☐ Joint Use of Facility
☐ Workshop

Name of the research project: Spectral-Compositional Relationships of LL

Ordinary Chondrites

Principal applicant: Daniel M. Applin

Affiliated institution and department: Centre for Terrestrial and Planetary Exploration.
University of Winnipeg

Collaborator

Name: Matthew Izawa

Affiliated institution and department: Institute for Planetary Materials

Research report:

- 1) Please write the research report with free format, but include followings: research purpose, actually conducted research, and research outcomes. If necessary, you can add another page.
- 2) For the workshop, please write the report for the workshop. Also, attach the program, abstracts, and list of the participants etc.
- 3) Please add Collaborator's Name, Affiliated institution and department as needed.
- 4) Please answer the question on the next page.

Research Purpose: Quantify the modal mineralogy of LL chondrite meteorites using X-ray diffraction and Rietveld refinement. LL chondrites are a potential surface material on near-Earth asteroids including 99942 Apophis, the target of the OSIRIS-APEX flyby mission.

Research Actually Conducted: By good fortune and careful scheduling of XRD runs, we were able to accomplish our goals for the LL chondrites with time to spare, so we were able to collect XRD data for a set of Martian shergottite meteorites and Lunar feldspathic breccias. Of particular interest are the variably shocked and brecciated Lunar meteorites, as several recent studies have suggested

that the Earth quasi-satellite body 469219 Kamoʻoalewa, which is targeted for sample return by the Chinese mission Tianwen-2, is composed of Lunar highlands material.

Outcomes: We will present the preliminary results of these studies at the 2025 Lunar and Planetary Science Conference.