

1/11/06

CURATORIAL BRANCH
SAMPLE PROCESSING PROCEDURE

DATE: February 29, 1980

SPP 72

SPECTRAL REFLECTANCE IMAGING
OF LUNAR CORE SAMPLES

1 INTRODUCTION

Spectral reflectance measurements are made on the sample remaining in the core holder after dissection. Soil is dissected down to about two-thirds of the core diameter which is 4 cm for large drive tubes of Apollo 15 and later missions and is 2 cm for earlier missions. The remaining portion of the core (about 20% by weight) is stabilized by two means. First, a glue-covered plastic strip is brought into contact with the exposed column of soil. When removed, this "peel" provides a stratigraphic record for binocular inspection. Second, the soil remaining after the peeling process is evacuated of air and impregnated with epoxy. This provides thin sectioning material.

The spectral reflectance images are taken twice -- once before the peel and once again after the peel is taken but before epoxy impregnation. The imaging is performed with the core in its holder on a set of rails beneath a light-diffusing hood, which isolates and protects it.

The core sample is particularly vulnerable at this stage in its processing, since soil is simply lying loose in the open holder. Because much of the value of the core is in its structures, no disturbance may be allowed. Great care in handling is essential.

In outline, the processing is:

- a) The dissected core is moved from the storage cabinet to room 270A.
- b) A scale and a palladium standard are mounted on the core holder.
- c) The core and holder are carefully slid into the diffusing hood in 270.
- d) Images are taken in different spectral regions for overlapping segments of the core. Field-of-view is about 4 cm square. The core must be moved incrementally for this sequence.
- e) The core is removed for peeling under the fume hood in 270A.

- f) The spectral reflectance measurements are repeated in 270.
- g) The core is impregnated with epoxy in 270A.

Note: As required by PI during imaging of the core in 270A, the reflectance from a pressed Halon standard will be measured.

2 RESPONSIBILITY

- 2.1 Contractor core personnel are to be the only handlers of the dissected core. All operations within the diffusing hood when a core is in residence will be performed by such persons.
- 2.2 The Curator will be present for all handling which involves picking up a core.
- 2.3 Technicians associated with the vidicon and related electronics will perform preliminary and maintenance tasks as required.

3 SAFETY

No specific CAUTIONS are incorporated; however, take common sense care in all actions.

4 DEFINITIONS

FØV - Field-of-view

5 REQUIRED EQUIPMENT

- 5.1 Diffusing hood with lights and electronic power supply and controller.
- 5.2 Optical system, pre-aligned and cleaned.
- 5.3 Vidicon with cooling jacket and controlling/data gathering electronics (to be shipped in for each set of runs, along with operating engineer).
- 5.4 Magnetic data tapes and logbook.
- 5.5 Supply of granulated or pelletized dry ice.

- 5.6 Palladium (Pd) metal plate, sandblasted for standard reference -- in holder.
- 5.7 Halon powder in piston holder for flat field standard.
- 5.8 Narrow metric scale (mm divisions) for mounting next to core.
- 5.9 Small diameter receptacle plate, if small diameter core is involved.
- 5.10 Spacer bars for sides of cradle, if small diameter core is involved.
- 5.11 Shim plate to elevate receptacle, if large diameter core is involved.

6 PROCEDURE

Note: Whenever a core resides in room 270, a core person must be present. Only the Curator or a core person may enter room 270A when the core resides there. A sign is also posted to that effect.

- 6.1 Verify that equipment is assembled and calibrated and that rooms 270 and 270A have been cleaned appropriately. The proper adaptor should be in place in the external hood tracks. The optics should be aligned and focused.
- 6.2 Install halon holder at the F \emptyset V focal plane, record image(s), then remove. Record calibration.
- 6.3 With the Curator present in the core dissection/storage room and concurring, transfer core (still in dissection holder) into room 270A. Secure door between 270 and hallway.
- 6.4 On a bench in 270A, remove bagging from around core. Remove cover plate, if installed.
- 6.5 Mount scale on core holder so as to be within optical field-of-view (F \emptyset V). Use glue required in peel procedure. Check alignment against dissection photos.

- 6.6 Move core to external portion of tracks of diffusing hood in 270. (For small diameter drive tube cores, place cradle in pre-installed adapter receptacle. For large diameter drive tube cores, place receptacle on pre-installed plate for standarization of focal plane.)

NOTE: Core must be installed so that scale is on side farthest from hood access port.

- 6.7 Slide core into position so that the FØV captures the intended image with at least 10% overlap.
- 6.8 Place palladium plate in holder alongside the core and within the intended FØV.

NOTE: Palladium must be on side nearest to hood access port.

- 6.9 Close entry port in diffusing hood.
- 6.10 Commence imaging, making one run for each filter and at least one dark field image. Record in logbook.
- 6.11 Open access port and slide core to next "station" FØV.
- 6.12 Repeat steps 6.7 through 6.11 for each "station" along the core, assuring adequate overlap.
- 6.13 Wait for instructions on CO or F4 from Curator for when and where to transfer core at this point.
- 6.14 Slide core out to external portion of tracks and remove palladium.
- 6.15 Move core to 270A flow bench and remove scale.
- 6.16 Perform peel operation and photography per procedure.
- 6.17 Repeat step 6.2. (Note: Steps 6.16 and 6.17 can be contemporaneous with 6.15.)
- 6.18 Refocus optics to lower focal plane (due to removal of soil by peel).

- 6.19 Repeat steps 6.5 through 6.14.
- 6.20 Repeat step 6.2.
- 6.21 Perform impregnation per procedure.
- 6.22 Once the core has been photographed and placed in the vacuum impregnation chamber, this procedure may be repeated for another core.

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This is a new procedure.

This procedure takes effect on the date of the last signature.

The term of the procedure is indefinite.