

10004
Drive Tube
44.8 grams

DRAFT



Figure 1: Half of drive tube 10004. S77-22631. Scale in cm.

Introduction

Drive tube 10004 collected about 13.5 cm of lunar soil, but was found to be “disturbed” when it was opened in the LRL (Kramer et al. 1977). The exact location is not known, but it was within a few meters of the LM and drive tube 10005. It was returned in ALSRC #1004 (vacuum tight).

Both Apollo 11 drive tubes were pressed into the regolith about 12 cm and hammered another 12 cm (Carrier et al. 1970). They were only partially filled, because the bit was wider than the tube, which required that the dry uncompressible soil had to “flow” into the tube (the design was changed for later missions). *The initial weight of 10004 given in the catalog (and Lunar Sourcebook!) is 51 g.*

Petrography

The Apollo 11 site was chosen to be flat and as free of rocks as possible. The regolith was found to be uniform over the whole area covered by the astronauts.

Fryxell et al. (1970) initially dissected and described the core. A more thorough description was made by Allton (1978). Some of the material in 10004 may have shifted because the Teflon follower was not in place.

The small rock was found located halfway along the core was (figure 4).

Grain size analysis was reported in the preliminary examination (figure 3).

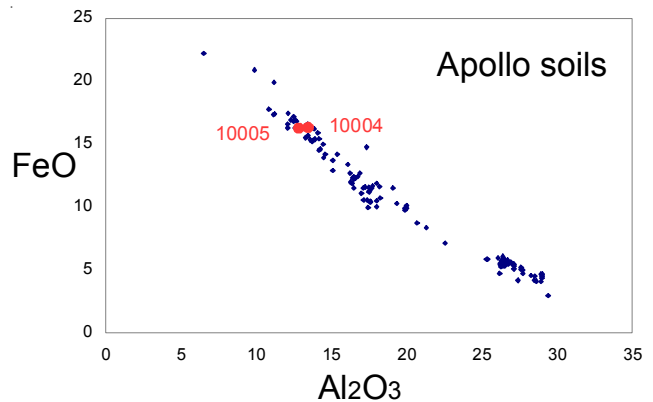


Figure 2: Chemical composition of Apollo 11 soils compared with other lunar soils.

Chemistry

The chemical composition of 10004 has not been reported, but it is presumed to be similar to the other Apollo 11 soils. Ma et al. (1980) reported the composition of 19 small basalt fragments from core 10004. Reed and Jovanovic (1971) determined Li, F, Cl, Br, Hg, Os and U for various depths in 10004.

Cosmogenic isotopes and exposure ages

Finkel et al. (1971) found a decrease with depth for ⁵³Mn activity.

Other Studies

Taylor et al. (1971), Oyama et al. (1971) and others conducted numerous investigations looking for organic compounds and/or evidence of any life in the lunar regolith.

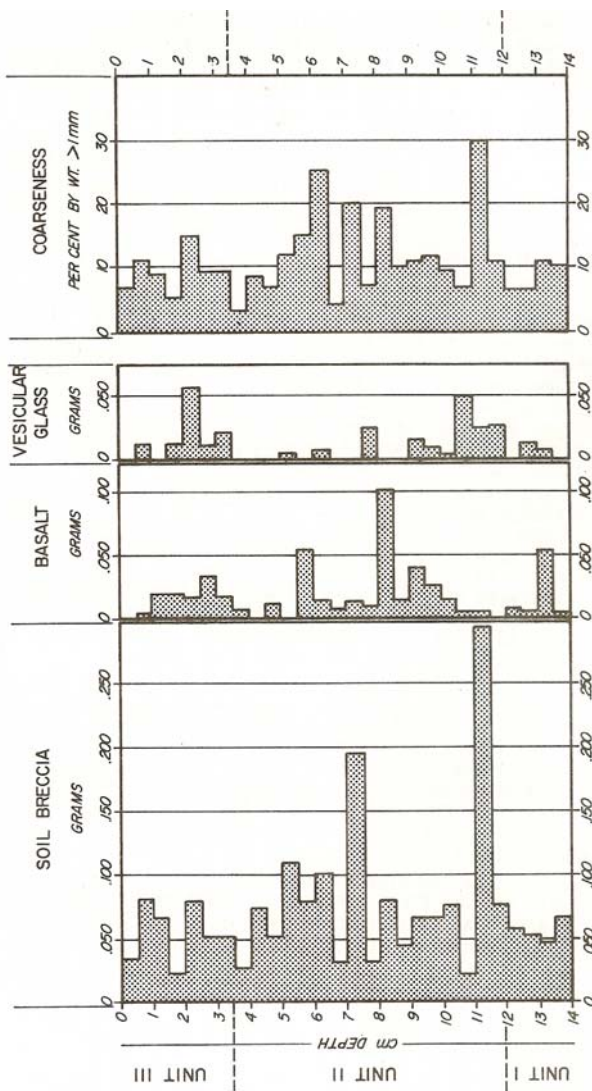


Figure 3: Percentage of particles as function of depth in drive tube 10004 (Allton 1978).

Fleischer et al. (1970), Crozaz et al. (1970) and Lal et al. (1970) studied nuclear tracks in minerals from different depths in these cores.

Dalymple and Doell (1970) and Hoyt et al. (1970) studied thermoluminescence.

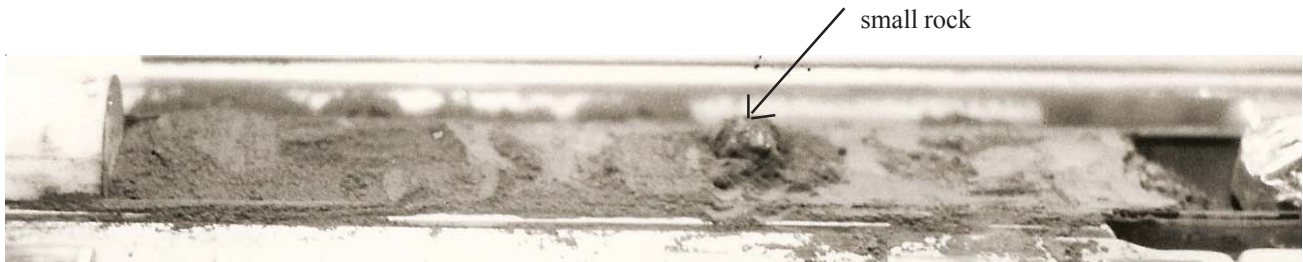


Figure 5: Photo of 10004 after material removed for 'biopool' split, showing a large particle about half way. S69-45537.

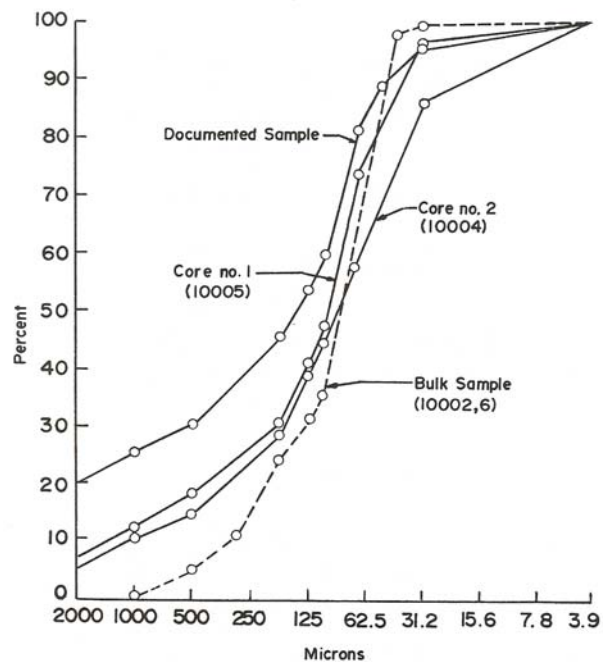


Figure 4: Grain size distribution of 10004 as reported in initial catalog (King 1969).

Processing

When the Apollo 11 cores were initially opened in the "bio prep lab" in 1969, about half of each was allocated to the 'Biopool' sample. It wasn't until 1978 that the remaining halves of the drive tubes were described and dissected (Allton 1978). In the meantime, the half dissected cores were stored in their Al liners, with a plexiglass cover (with the added complexity that they were apparently turned over on their covers).

Early allocations (1969) were from depths 0 cm, 3.3 cm, 6.6 cm, 9.9 cm, and 13.2 cm. Walker received samples from 2 cm, 3 cm, 6 cm, 9 cm and 12 cm. Although allocations were made to Morris and McKay, data is not available.

General information on drive tubes is found in another section of this compendium.

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