

Particle Size Distribution Measurement of Lunar Soil Collected by NASA Apollo 11

High-Precision Measurement with Microtrac MT3000, Replacing Conventional Sieving Method

Overview

Microtrac series devices for particle size distribution measurement were used for a variety of research activities at NASA (National Aeronautics and Space Administration, USA).

(Models used: Microtrac MT3000 II, Nanotrac, Microtrac Bluewave)

Apollo Program

This was the first manned moon landing mission achieved by NASA between 1961 and 1975, recording the first visit of humans to an astronomical body other than the earth. This is quite a remarkable scientific performance deserving permanent entry in the history of space development or (it should be said) in the history of mankind.

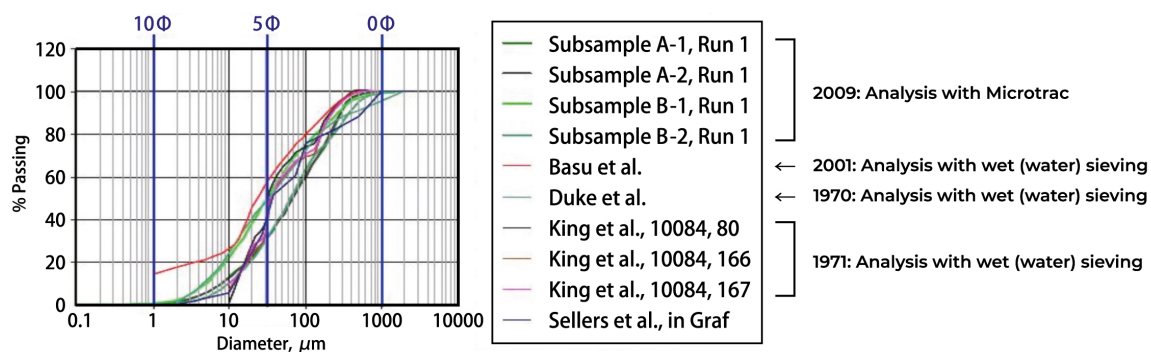
- Why moon surface soil is needed for research
 - For use as a material for construction of moon surface bases in the future
 - For evaluation of the influence of fine dust on humans, objects and environments
 - For utilization in devising Mars exploration plans in the future

Analysis of Correlation With Sieving Results

NASA used sieving for particle size distribution measurement on most of the moon soil collected during the Apollo Program. Sieving, however, involves problems such as much time taken for measurement, large quantity of sample needed, likelihood for sample scattering/adherence, and questionable reliability of analysis data on submicron / nano-size particles (smaller than 10 μm).

To resolve these problems, NASA later adopted Microtrac (a particle size distribution measurement system based on laser diffraction/light scattering technology).

- Reasons why NASA selected Microtrac from many available products of this type
 - Excellent analytical accuracy and reproducibility
 - Easy handling
 - Rapid multi-sample analysis



Results

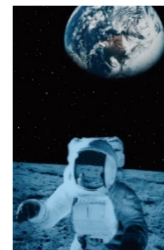
This analysis revealed a high correlation between the results of sieving conducted in 2001 and the results of particle size measurement (particles $\leq 90 \mu\text{m}$) using Microtrac. NASA thus concluded that Microtrac is superior in terms of handling ease and reproducibility and is promising to be a major tool for future particle size distribution measurement of planetary soil and dust.

References

40th Lunar and Planetary Science Conference (2009)

NEW MEASUREMENTS OF PARTICLE SIZE DISTRIBUTION OF APOLLO 11 LUNAR SOIL

Note: This document does not demonstrate or imply
NASA recommendations of our products.



For further information please contact us at:

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