

CHEMICAL COMPOSITIONS OF APOLLO 14, APOLLO 15, AND LUNA 16 MATERIAL: C.C. Schnetzler, J.A. Philpotts, D.F. Nava, H.H. Thomas, NASA/Goddard Space Flight Center, Greenbelt, Md 20771; M.L. Bottino, U. of N.C., Chapel Hill, N.C.; J.L. Barker, Jr., U. of Md College Park, Md.

Work in this laboratory, since the Second Lunar Science Conference, has been on Apollo 14, Luna 16 and Apollo 15 samples. Analyses include Si, Ti, Al, Fe, Mg, Ca, Na, K, Mn, P and Cr by atomic absorption spectrophotometry and colorimetry; Li, K, Rb, Sr, Ba, nine rare-earth elements, Zr, and Hf by stable isotope dilution; and Fe, Co, Na, Mn and Sc by instrumental neutron activation analysis.

Soils from the Apollo 14 Fra Mauro site have quite similar chemical compositions, both laterally and with depth; the regolith at this site has apparently been well mixed. The composition of igneous rock 14310 resembles the composition of the 14 soils; it may represent remelted soil. Apollo 14 materials most closely resemble in composition the exotic fragments, such as KREEP or norite, found in Apollo 11 and 12 soils, or the dark portion of rock 12013. Similarities between chemical characteristics of Apollo 12 soils and breccias, rock 12013, and Apollo 14 soils and igneous rock 14310 suggest that extensive quantities of Fra Mauro-like material have been transferred to the Apollo 12 mare site.

Isotope dilution analyses were obtained on two <125 $\mu$  Luna 16 regolith fines samples from different depths in the core, and four rock-chips, including both igneous rocks and breccias. These materials have similar trace-element concentrations. This suggests a largely local derivation of the Luna 16 regolith, unless the Luna 16 igneous rocks are remelted soil. The Luna 16 materials differ from Apollo 11, 12 and 14 lunar samples in a manner suggesting the presence of excess feldspar; i.e., the Luna 16 samples have higher K/Rb, lower Rb/Sr and lower Sm/Eu ratios.

To date, only two Apollo 15 samples have been analyzed: igneous rock 15555 and soil 15531. The igneous rock has the lowest concentration of rare-earth elements and smallest negative Eu anomaly of any Apollo 11, 12, 14 or Luna 16 sample. Plagioclase/whole-rock trace-element distributions from this rock are similar to those obtained from Apollo 11, 12 and 14 plagioclase-whole-rock pairs. Soil 15531 Ba and rare-earth concentrations are two to four times higher than the igneous rock, requiring another component in the soil. Not more than 7 to 8% KREEP in the soil would account for the differences in composition.

Six portions of the Apollo 15 nine-meter core tube are being analyzed for major and trace elements; the results will be reported at the Conference.