
Apollo 15 drill core samples from two different sections and a surface fine sample from the Apollo 16 mission were examined for aromatic hydrocarbons and porphyrins. The core sample was collected from near the Apollo Lunar Surface Experiments Package (ALSEP) at Station 8, about 50 m. from the ALSEP Central Station. The core taken, 240 cm. long, yielded the following samples used in the present study: 15001 (3 gm.) from about 200 - 240 cm. below the lunar surface and 15002 (3 gm.) from about 160 - 200 cm. below the surface. The Apollo 16 surface fines sample (5 gm.) was collected unsieved from Station 5.

The samples were Soxhlet-extracted separately under an atmosphere of argon, by means of benzene: methanol 3/2 v/v for a period of 24 hours. The extracts were concentrated to a volume of 0.3 ml. and their fluorescence properties examined for free base porphyrins and aromatic hydrocarbons. They were then carried through a demetallation procedure, as described previously (1), and again fluorometrically for metalloporphyrins. A procedural blank of 200-mesh optical quartz and a reagent blank were carried through the procedure and compared to a solution made by demetallating 0.1 ng. of Ni-mesoporphyrin IX. Fluorescence spectra were obtained with an Aminco Bowman spectrophotofluorometer at an excitation setting of 400 nm.

No fluorescence different from the blank was found for the lunar samples examined, even with the aid of computer-enhancement of the data as described previously (2). With this method one could conservatively detect 0.1 ng of Ni-mesoporphyrin IX (2 X 10^{-13} moles), a typical metalloporphyrin. The lunar samples examined in this study, Apollo 15 (15001, 15002) and Apollo 16 (66500) weighed 3, 3 and 5 gm., respectively so that if we assume the presence of Ni-mesoporphyrin IX or equivalent this means that we could have detected 7 X 10^{-14} moles/gm. for the core samples and 4 X 10^{-14} moles/gm for the surface sample.

This work therefore strongly suggests that no porphyrins or aromatic hydrocarbons are present in these lunar samples in any significant amounts.

References