INFRARED AND THERMAL PROPERTIES OF LUNAR ROCK

J. A. Bastin and P. E. Clegg

Physics Department, Queen Mary College, London University

D. O. Gough

Institute of Theoretical Astronomy, Cambridge

ABSTRACT

Previously reported determinations of far infrared absorption properties of lunar fines have been checked by a variety of techniques and extended to crystalline material. The results confirm a very rapid increase of absorption coefficient with frequency in the submillimetre range and, in the case of the fines, they suggest some attenuation by scattering. In addition, the thermal conductivity of the fines has been measured by a direct method using a small sample, with a step function input at one surface and a radiative measurement of the temperature at the other surface. A value of 3.5×10^{-3} W M^{-1} $^{o}K^{-1}$ has been determined for lightly trowelled material, and the variation of conductivity with outgassing, and degree of compaction has been investigated. From these measurements the total temperature difference in the regolith layer for various values of the assumed internal heat flux has been determined. The dielectric constant for igneous rock at 9×10^{11} Hz has been measured.