

Imaging Spectrometry: A Strategy to Move From "Remote Sensing"
to "Remote Measurement" for Geological. Application.

Robert O. Green

Jet Propulsion Laboratory
California Institute of Technology
4800 Oak Grove Dr
Pasadena, CA 91109

In the laboratory for more than 100 years, chemists and physicists have used spectra to identify materials based on fundamental molecular absorption. Today, imaging spectrometers are being developed to collect spectra as images from remote platforms to fulfill the same objectives. For example, NASA's Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) is currently being used to pursue advanced research in land, water and atmosphere environments of the Earth.

Because rocks are comprised of minerals and minerals are molecules, the application of imaging spectrometry to geology is straightforward. For a wide range of minerals, the measurement of a molecular absorption in an AVIRIS spectrum provides unambiguous determination that the molecule is present. In this way, imaging spectrometers are self validating. This is not true of multispectral approaches. Imaging spectrometry provides a pathway to move from "Remote Sensing" to "Remote Measurement" for geological applications. An end-to-end example of the use of calibrated AVIRIS data to map surface mineralogy based on the molecular absorption spectra is presented.