The U. S. Geological Survey, Digital Spectral Reflectance Library: Version 1: 0.2 to 3.0 μm

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We have developed a digital reflectance spectral library, with management and spectral analysis software. The library includes 500 spectra of 447 samples (some samples include a series of grain sizes) measured from approximately 0.2 to 3.0 μm. The spectral resolution (Full Width Half Maximum) of the reflectance data is ≤ 4 nm in the visible (0.2-0.8 μm) and ≤ 10 nm in the NIR (0.8-2.35 μm). All spectra were corrected to absolute reflectance using an NBS Halon standard. Library management software lets users search on parameters (e.g. chemical formulae, chemical analyses, purity of samples, mineral groups, etc.) as well as spectral features.

Minerals from sulfide, oxide, hydroxide, halide, carbonate, nitrate, borate, phosphate, and silicate groups are represented. X-Ray and chemical analyses are tabulated for many of the entries, and all samples have been evaluated for spectral purity. The library also contains end and intermediate members for the olivine, garnet, scapolite, montmorillonite, muscovite, jarosite, and alunite solid-solution series. We have included representative spectra of H_2O ice, kerogen, ammonium-bearing minerals, rare-earth oxides, desert varnish coatings, kaolinite crystallinity series, kaolinite-smectite series, zeolite series, and an extensive evaporite series. Because of the importance of vegetation to climate-change studies we have include 17 spectra of tree leaves, bushes, and grasses.

The library and software will be available as a U.S.G.S. open file report. PC user software is available to convert the binary data to ascii files (a separate U.S.G.S. open file report). Additionally, an ftp binary file will be on line at the U.S.G.S. in Denver. Users may build customized libraries for their own instruments using the library software. We are currently extending spectral coverage to 150 μm and will make this library available on CD-ROM.