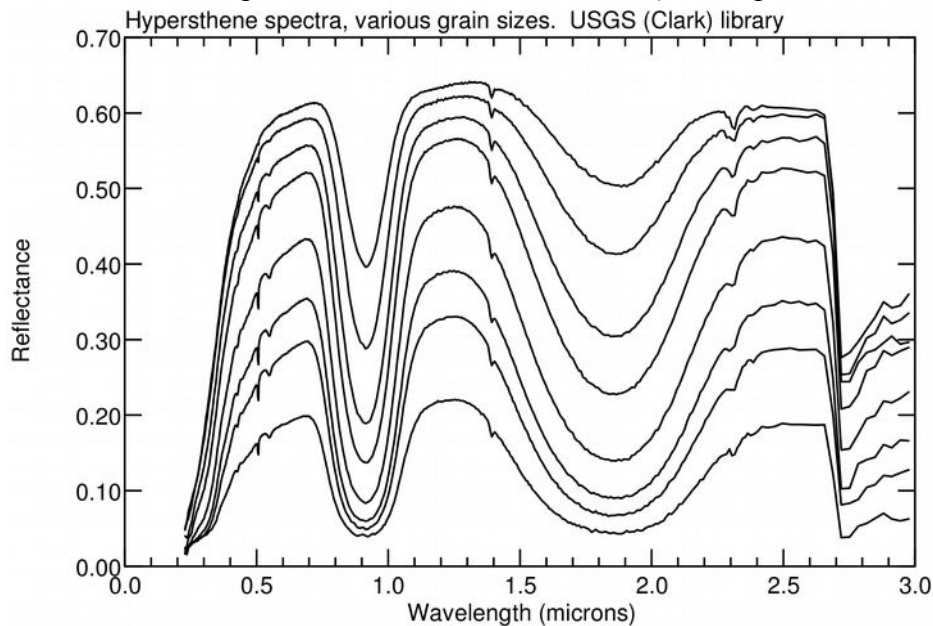


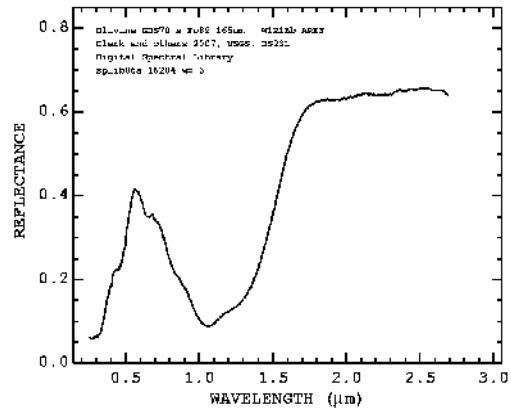
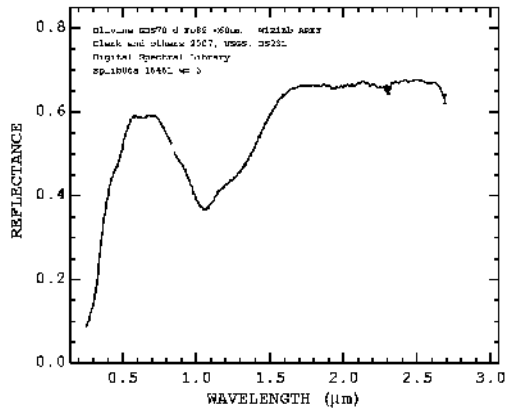
Homework #2
SOLUTION
Assigned Feb. 2, 2018
Due Friday Feb. 9, 2018
Geology 4113 (Remote Sensing)

1) Band Depth vs. Grain Size (30 points)

a) (15 points) Because absorption is a volume effect while reflection and scattering are surface effects, and because with grains of size r we have (surface)/(volume) $\propto r^2/r^3 \propto 1/r$, reflection will be more important for small grains while absorption will be more important for large grains. Therefore in the figure the top spectrum with high reflectance and shallow absorption bands corresponds to the smallest ($7 \mu\text{m}$) grains. Each successively lower spectrum is a larger size grain till at the bottom the low reflectance spectrum with deep bands (deep measured as a percent of maximum reflectance) corresponds to the $>250 \mu\text{m}$ grains.



b) (15 points) The same pattern applies to olivine, as shown in the following plots from the USGS spectral library. Both are of the olivine sample “GDS70.a Fo89 W1R1Bb AREF”, with the one on the right being <math><60 \mu\text{m}</math> grains and the one on the left being



2) Color displays (10 Points)

The pyroxene has high reflectance in the