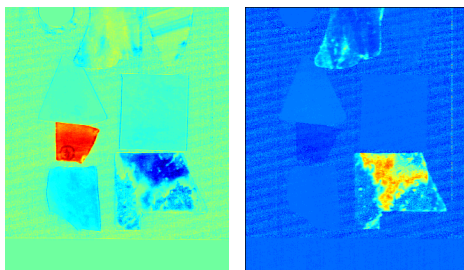


INORGANICS AND MINERALS

Applications

Hyperspectral imaging can be used to map surface mineral distributions via remote sensing / airborne technology. The SWIR, VNIR or thermal IR wavelength ranges provide useful spectral information for differentiating these types of materials. The SisuROCK™ is a system targeted to mineral identification from geological core samples. For more information about SisuROCK, please refer to the Complete Systems chapter or contact Middleton Research.

Hyperspectral imaging can be used to analyze many different inorganic materials. In this example, multiple samples of various minerals used to mimic jade were measured with a SWIR hyperspectral camera (1000 – 2500 nm) and compared with similar measurements of authentic jade (Burmese jadeite). The components were predicted with the SBC hyperspectral image analysis method. (Marbach, 2007)

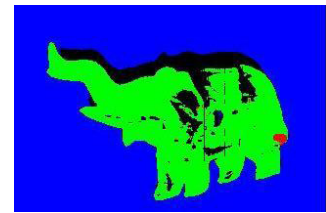
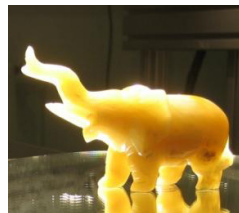


Jadeite

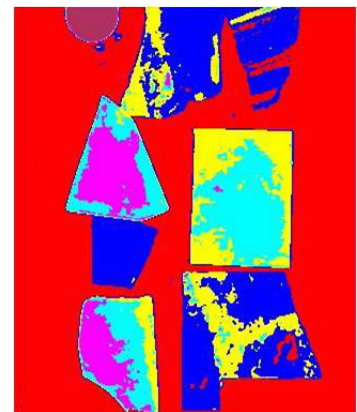
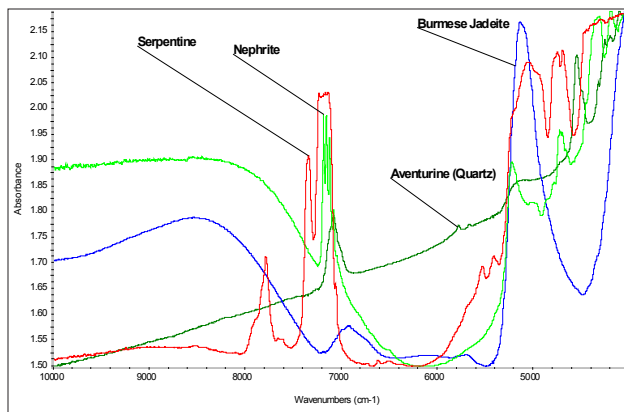
Nephrite

The image on the far left shows the relative intensity of the predicted jadeite – red indicates a higher intensity. The next image shows the relative intensity of predicted nephrite. Both images include several pieces of imitation jade.

HSI was also used to obtain another image of a jade artifact that contained a small repair (photo on right). The red part of the hyperspectral prediction image (far right) clearly identified the repair as chemically different from the inorganic material comprising the bulk of the statuette. Different minerals show very different spectral characteristics in the SWIR wavelength range for example and this allows the identification of minerals.



Other inorganic and mineral applications for hyperspectral imaging technology, such as examining soil properties, identifying different minerals remotely, on the ground, and even inside mines, can be performed in the SWIR, VNIR and the LWIR regions.



Reference

Marbach, R. (2007). Multivariate calibration a science-based method part 1. *Pharmaceutical Manufacturing*, 42-47.