

NONDESTRUCTIVE MINERAL IDENTIFICATION OF PIGMENTS IN PERUVIAN POTTERY

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Nondestructive analysis of anthropological and of archeological artifacts is much preferred since unaltered, they retain both their aesthetic value and their physical properties. Thus, they are available for comparison as additional material is recovered and are available for future analysis as new techniques are developed.

X-ray diffraction using parallel geometry and a fixed incident beam illuminates a very small area (0.2 mm x 5 mm). If the pigment in paint is a fine powder that has not been altered by firing to a high temperature, identifiable diffraction patterns can be collected. If the instrument has a positive position detector, it is very suitable for rapid survey of a large number of samples since data collection is much faster than a parafocusing system where a single detector has to stop and count at each step of the scan. Using a lab jack and a simple positioning jig, it is possible to minimize the peak shift due to sample displacement.

In this demonstration study, the paints of 4-color, Nasca, pottery sherds from five periods were analyzed. To aid in the mineral identification, chemical composition from laser ablation ICP-MS analysis was also available. By identifying the minerals used as pigments and by looking for changes in minerals used as pigments, some of the potential questions that may be addressed include identification of the source/sources and/or changes of the sources of the minerals used as well as modifications of the technology.