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Clay Identification using X-Ray Diffraction and Scanning Electron Microscope in "Wild Clay Project"

In an initiative with the International Wild Clay Research Project (IWCRP), the MSU Art Department and Earth Science Department are collaborating to apply mineralogical studies to native clays of Montana and Minnesota. Bulk mineralogical analysis was done through X-ray Powder Diffraction (XRD) and scanning electron microscope (SEM) techniques. Analysis of oriented clay mounts created using USGS guidelines found that the primary clay in the samples was illite. The minerals associated with this group included muscovite, biotite, microcline, anorthite, and albite. Quartz was found throughout most of the 14 samples. In addition to spot analyses, the SEM was used to analyze fired and glazed clay disks to determine the depth of glaze penetration and compositional or structural changes to the clays after being baked. The results of this study will be applied to the ongoing research done for the IWCRP as well as being applied directly to ceramics classes at Montana State University. The IWCRP hopes to encourage the use of local clay and to advance sustainable practices in ceramic arts. The data collected with this project will be used to serve as a foundation for a database about wild clays. The information in this database will allow artists to find a clay that is local, sustainable, and suitable for their ceramics. Further collaboration for the project is expected in the future, with the possibility of joint field trips between art and earth science students to study the places where these clays have been harvested.