EXPLORATORY STUDIES INTO POSSIBLE USES OF CALCAREOUS DOLOSTONE ON THE SHIVWITS PLATEAU

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CLAY ADDITIVE

The Shivwits Plateau clays are smectite clays, capable of adsorbing large quantities of water. This property makes the clays overly plastic, difficult to work, and subject to cracking while drying. In other areas of the world, potters have been known to add calcium to such overly plastic clays to improve their properties for ceramic manufacture. Experiments were undertaken to investigate whether powdered calcareous dolostone added to the Shivwits Plateau clays might function in a similar manner.

To investigate this issue, ground clays were mixed with dolostone and sand temper. Four sets of pastes were produced: (1) a set containing no temper and no dolostone; (2) a set containing dolostone but no temper; (3) a set containing temper but no dolostone, and (4) a set containing both temper and dolostone. The clays were made into tiles, which were folded at the center to form vertical walls, and fired to a temperature of 700°C.

CLAY ADDITIVE RESULTS

The pastes containing calcareous dolostone were less sticky compared to those without the dolostone. However, this effect was slight.

All test tiles formed cracks during drying and firing. However, this effect was most pronounced for tiles lacking both dolostone and temper. All six of these tiles broke in half during the firing process, compared to only two of the other tiles.

Our data suggest that the addition of powdered dolostone does reduce the plasticity of Shivwits Plateau clays, though in our experiments the results were minor. We are currently conducting additional studies to determine whether this effect is magnified when larger quantities of dolostone are used. Chemical and petrographic studies are also underway to determine whether calcareous dolostone was added to pottery made on the Shivwits Plateau.

BACKGROUND

Excavations on the Shivwits Plateau suggest that calcareous dolostone was regularly procured and used by the inhabitants of the Mt. Dellenbaugh region. Calcareous dolostone, a soft, powdery calcium carbonate, is not local to the Mt. Dellenbaugh area, but was presumably procured from somewhere beneath the rim of the Grand Canyon. In this poster, we present the results of exploratory experiments into possible uses of this resource. Specifically, we evaluate the performance characteristics of powdered dolostone with reference to two activities: ceramic manufacture and pigment production.

PIGMENT EXPERIMENTS

In 2006, the University of Nevada Las Vegas initiated excavations at Lava Ridge Ruin, a sixteen-room pueblo dating to the middle 12th century. Despite the fact that the site was located on a volcanic substrate, abundant fragments of white, chalky sedimentary stones littered the site. X-ray diffraction analysis of the material indicates that the rock is a calcareous dolostone, comprised primarily of dolomite and calcite.

Often, these stones – which sometimes, though not always, exhibited wear on their edges – were found on room floors or in niches in room walls. These recovery contexts suggest that this non-local resource was important to the inhabitants of Lava Ridge Ruin. However, why these rocks were procured and how they might have been used is unknown.

Experiments were conducted to explore two possible functions for the calcareous dolostone. These include use (1) as a clay additive, and (2) as a pigment.

PIGMENT RESULTS

Our results indicate that calcareous dolostone can function as a base for paint. However, they also show that the rock type used to process the pigment and the binding agent selected influences the paint properties.

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