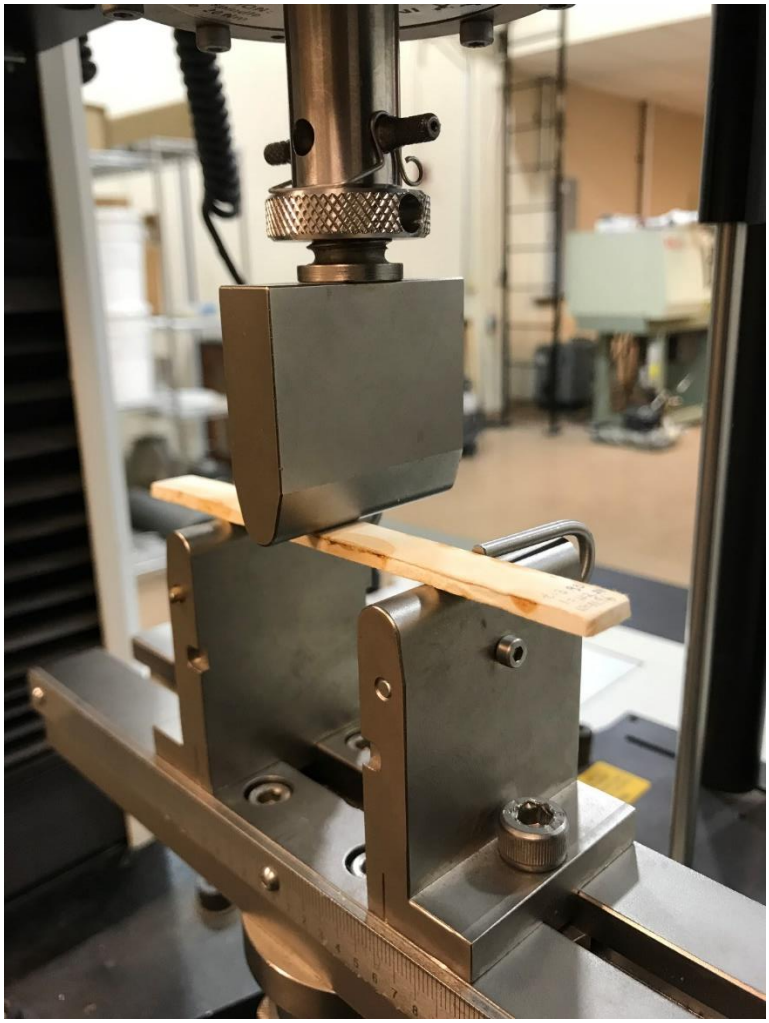

Photographed by Sally G. Kim

A Potential New Fill Material for Ceramics: Determining the Suitability of *La Doll Clay*

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1. INTRODUCTION

The purpose of this study was to test the potential of a commercial product, *La Doll Clay*, as a fill material for ceramics. *La Doll Clay* is an air-dry clay manufactured by Padico Co., Ltd. and is distributed in North America by Activa Products Inc. It has unique working properties that make it a prospective substitute for plaster of Paris as a fill material for ceramics. The clay air-dries with minimal shrinkage, is very pliable, is miscible with water, and adheres to various substrates (e.g. glass, plastic, wood).

The chemical composition and mechanical properties are, however, not publicly released. Thus, the chemical components were identified with XRF, FTIR and polarized light microscopy. The physical

properties were measured using Vickers hardness, three-point bending and volume shrinkage tests. The findings were then compared with those of plaster of Paris. The clay was concluded to be not a good substitute for plaster of Paris.

2. MATERIALS AND METHODS

The chemical components in *La Doll Clay* were identified with XRF, FTIR and polarized light microscopy. The physical properties were characterized and measured with Vickers hardness, three-point bending and volume shrinkage tests. ASTM standards were used.

3. RESULTS AND DISCUSSION

XRF, FTIR and polarized light microscopy were important at identifying most, if not all, ingredients in *La Doll Clay*: pumice, talc and paper pulp. The binder was identified as a carbohydrate-based gum (fig.1).

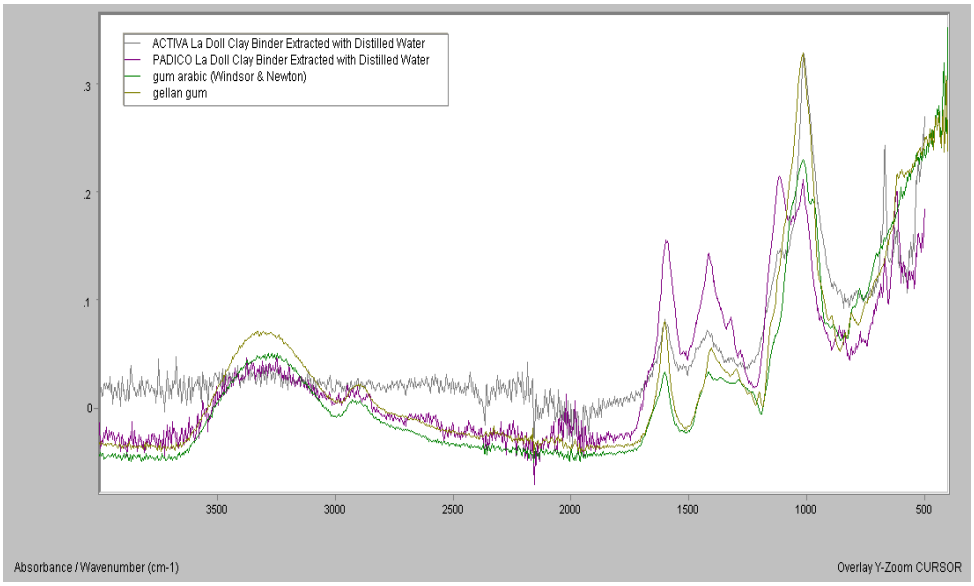

Figure 1. Infrared spectra of a carbohydrate-based gum in *La Doll Clay* samples

The stress-strain responses between *La Doll Clays* and plaster of Paris were different (fig.2). Plaster of Paris samples shattered completely under load. By comparison, *La Doll Clays* went under elastic and then plastic deformation.

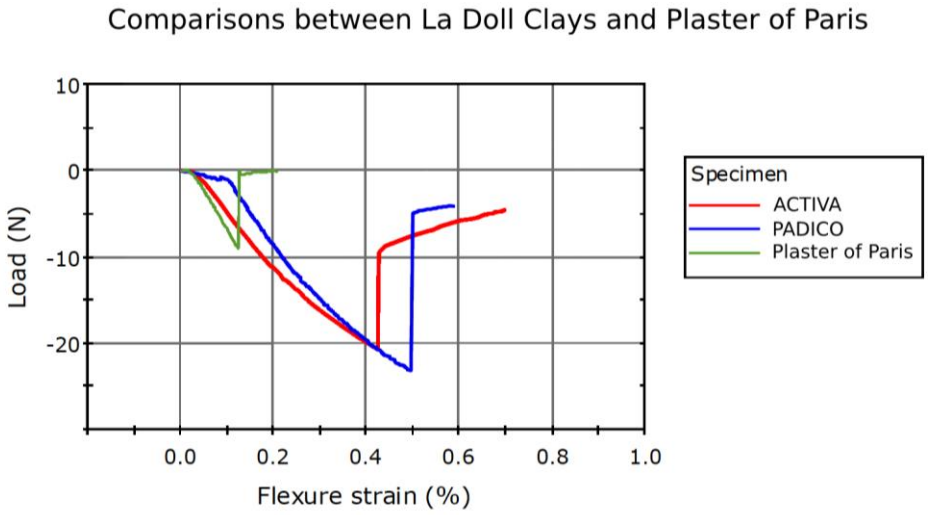

Figure 2. Comparisons of stress-strain responses between *La Doll Clays* and plaster of Paris

La Doll Clays had the shrinkage of approximately 7.0 %. The shrinkage was not better than plaster of Paris, which tends to expand approximately 0.15 – 0.5% upon curing.

4. CONCLUSION

In conclusion, *La Doll Clay* is not a good substitute for plaster of Paris. Despite its appeal as a fill material, it has limits. This paper only confirmed the presence of silicates and identified the binder.

Still, the clay has properties desirable for use in conservation, for example, low brittleness, working properties and reversibility. Several conservators mentioned that they have been using air-dry clay as fill materials for woodworks to take advantage of its hygroscopic nature. Perhaps, *La Doll Clay* would be a more suitable fill material for wooden artifacts than for ceramics. Further research would however be required.

5. ACKNOWLEDGMENT

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