Santa Maria Clays as Ceramic Raw Materials

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Abstract. There are evidences and records concerning clay exploitation for pottery in the island of Santa Maria (Azores, Portugal) in the past. Nowadays this activity is almost extinct but this is the only island in the archipelago with abundant residual and sedimentary clay deposits. To evaluate the applicability of clays from this island for modern ceramics, a campaign made in May 2017 allowed collecting twenty samples in several outcrops all over the island. All samples were subsequently analyzed in terms of granulometry, mineralogy, chemical composition and physical properties. Results revealed to be interesting, namely concerning mineralogical composition, where phyllosilicates such as Kaolinite are in high percentages. Granulometry also revealed that most part of the samples is composed by fine grain size particles (<63 µm), which can be a good indicator of the existence of resources in great quantity.

Keywords: Santa Maria Island · Pottery · Physical characterization · Potentialities

1 Introduction

Santa Maria, the oldest and most oriental island from the archipelago, is very weathered, as consequence of intense volcanic activity alternated with sea level alterations and intense erosion episodes. There are residual and sedimentary clayey deposits in several parts of the island, one of which known as “Red Desert”, corresponding to Feteiras Formation. In addition to the previous, Almagreira Formation is other important deposit of the island. These two in particular were more studied. The abundance of raw materials, gave this island an ancient tradition concerning exploitation of clays for pottery, being known as the “mother island” of clay. From this island, during centuries, white clays were extracted and exported to provide other islands. Recently a pottery oven was discovery “in the middle” of Vila do Porto and it date from the 18th century.

2 Methods and Approaches

Chemical composition was assessed by X-ray fluorescence, qualitative and semi-quantitative mineralogical analyses were carried out by X-ray diffraction and crystallochemistry analyses were carried on a Scanning Electron Microscope (SEM) Hitachi

SU70 with Energy Dispersive X-Ray Spectroscopy (EDS) Brucker QUANTAX 400. Viscosity was assessed with a Haake Viscotester iQ. Plasticity Index was also computed from Atterberg Limits determination.

3 Results and Conclusions

Results are very positive since most part of samples are rich on phyllosilicates (69% to 98%, being kaolinite the most common), fine-grained, and showing adequate plasticity and viscosity. Geological formations, in particular Feteiras and Almagreira Formations, outcrops on a large part of the island, the residual ones showing always intensive alteration, therefore assuring the existence of good reserves.

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