



Individuation of Characteristic Parameters of “Glass Paste” of Meridional Etruria by the Use of Scientific Methodologies

F. Cecere¹, A. Carraro², D. Ferro³ and G. Visco¹

¹Rome University, “La Sapienza”, Rome, Italy

²Museo di Villa Giulia, Soprintendenza Archeologica dell’Etruria Meridionale, Rome, Italy

³CNR Istituto per lo Studio dei Materiali Nanostrutturati, Rome, Italy

Abstract

The aim of this work has been to individuate objective chemical parameters to describe the material constituting glass decorations in the Etruscan jewellery, by the use of scientific methodologies and statistical treatments of the analytical data. The obtained results allowed to characterize particular glass pearls of Etruscan necklaces, in particular those composing an important jewel from the Castellani’s Collection. The collected data elaborated through the multi elements analysis furnished useful informations for their historical and geographic collocation and for a knowledge on the technology connected with the manufactures realization.

Introduction

Glass has been utilized as decorative elements in the ancient jewellery, in particular to realize necklace pearls, pendants bracelets. More than one term to indicate this kind of material is reported in literature as “glass paste” or “glassy faience” [1, 2], but these terms are used with a wide range of meanings, and very often induce an uncorrected interpretation of the jewel technology. For this purpose the aim of the present work is to carry out a focused research to attempt a classification of this particular class of glassy materials. The study includes samples coming from Etruscan areas and the obtained results furnished useful information on their historical and geographic collocation and in particular on the probable existence of local production sites.

Materials & Methods

The analyzed samples consist of fragments of glassy materials with different colours of necklaces coming from the zone including Nepi and Cerveteri and a precious necklace of the Castellani’s Collection, Fig. 1. Sampling of sand materials coming from areas indicated in the historical fonts have been done to compare the elemental composition of the rough materials and the manufactures Nepi, Necropoli di Sante Grotte, Cerveteri, e Lucus Feroniae.

The analytical and morphological investigation have been carried out by SEM EDS.

For each sample several analyses have been performed on areas homogeneous for morphology and for grey level contrast, so to individuate the composition of the single inclusions and of the matrix.



Fig.1 Castellani’s necklace Cerveteri IV cent. b.C

This methodological approach led the collection of a big number of values whose treatments made necessary the utilization of correlation systems and multivariate analysis. The procedure has been suitable to identify comparison parameters among the oxidized species present in the different glass paste and sand.

Results

The different provenance of the glassy materials has been well determined by the EDS analyses, by permitting to distinguish the different group of oxides that characterize the glass, (SiO_2 , Na_2O , K_2O , MgO , CaO e Al_2O_3). The vitreous materials contain big amount of silica, small

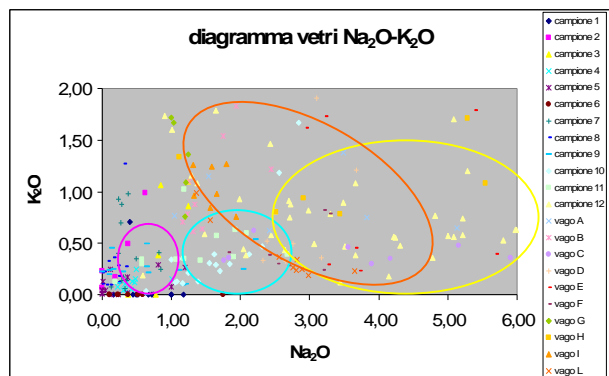


Fig.2 Correlation diagram for K_2O and Na_2O species

amount of K and Mg and relevant percentages of Na, Ca, Al. On the contrary the sands present small quantities of silica, high quantities of K, Ca, Al and small amount of Na and Mg. Other considerations have been made by the treatment of the analytical values, an example is given in the Fig. 2 for the comparison among the K_2O and Na_2O species. This scientific procedure applied allowed us to define the term “glass paste” as “vitreous materials not homogeneous characterized by crystalline grains included in a glassy matrix”. From the multivariate analysis, other indications on the quality of the glass used for the jewellery work, as been derived. For example, as concerns the glass

past intrinsic composition it has been possible to note that SiO_2 content decreases on the contrary that of Na_2O e K_2O increases.

This can be justified by considering that the glass paste was get at a temperature of about 850°C lower than that employed in the glass preparation 1000°C . This mean that to obtain the fusion, even if only partially, of the not homogeneous mass, it was essential to reduce the percentage of the glass grid former and improve the amount of the fondant substances. The great opportunity to produce one of the rare studies on an object of the Castellani's Collection, allowed to characterize the materials composing the pearls, by collocating the finding as an Etruscan production by the comparison of the composition values.

Conclusions

The study demonstrates that an opportune elaboration of data joined with a precise study of the nature of the vitreous material in the past, can answer a great number of questions related to the “glass paste” matter. Further studies, by involving either different samples, either instruments for the trace elements detection, will be necessary for a more precise comprehension of the whole problem, but any way the application of the multivariate analyses can be an important tool for the historical interpretation of the analytical data.

References

- 1) R. Gherard, *Oggetti preistorici in pasta vitrea nell'area Alpina*, on “Ori delle Alpi”, Ed. Comune di Trento (1997)
- 2) A. Baviati, M. Verità, I vetri di Frattesina, Centro di produzione vetraria nell'età del bronzo finale, *Rivista della Stazione Sperimentale per il vetro*, 4 (1989)