

Beyond the Decoration; Mineralogical and Micro-structural Study of the Bronze Age “Life Cycle Jar Pottery” from Keshik Cemetery, Sistan and Balouchistan, Iran

Yasin Sedghi¹, Mehdi Razani¹, Farahangiz Sabouhi Sani², Mohammadamin Emami^{2,3,*}

¹ Department of Archaeometry, Faculty of Cultural Materials Conservation, Tabriz Islamic Art University, Iran.

² Department of Conservation of Cultural Properties and Archaeometry, Art University of Isfahan, Iran.

³ Institut de Recherche sur les Archéomatériaux-Centre de Recherche en Physique Appliquée à l'Archéologie (IRAMAT-CRP2A), Université Bordeaux Montaigne, France

* Corresponding author and speaker: m.emami@ui.ac.ir

Abstract

The present study focuses on a unique type of pottery, the so-called Life Cycle Jar, in association with 8 more sherds, which were discovered in the Keshik cemetery (3rd Millennium BC). The samples were investigated through classical analytical methods, such as thin-section petrography, XRPD and SEM-EDX in order to identify the production techniques, the structure, the surface finishing and the pigments used for the decoration. Mineralogical- chemical investigations revealed that the discriminating factors between the various potteries were significant from the technical point of view. The “Life Cycle Jar” sample shows the characteristics of wheel-thrown vessels with a definite orientation of pores in the thin section. Most investigated ceramics can be defined as being low-fired (ca. 750°C), as indicated by the occurrences of inclusions in form of calcite within the matrix of the potteries. The other samples can be defined high-fired sherds (ca. 900°C-1000°C) and are characterized by the red and green color of the matrix. The microstructural characteristics of the potteries showed both low-fired and pre-sintering textures. The analysis of the pigments applied as decoration motives on the surface of the painted Life Cycle Jar Pottery, showed that the pigments consist of iron oxide-based minerals in the case of the red-orange color (like maghemite and hematite), and favorable manganese oxide in the case of the brown-black pigments on the vessels.

Keywords: ancient pottery, Life Cycle Jar, petrography, XRPD, SEM-EDX, Keshik cemetery, Bronze Age, Sistan, Balouchistan