A systematic approach to Bronze corrosion products and the methods of treatment, applied on three bronze anklets from Dhamar museum, Yemen.

Abstract

Three bronze anklets, found during the archaeological excavation of Yemeni mission A.D, in Gabal al-lawd, Jawf area, Yemen and, dated back to Minaean period in Yemen [sixth century B.C – 42 B.C], are now in Dhamar regional museum. They suffered deterioration: two of these anklets had a thick corrosion products of pale-green/brown, the third had a rust-colored Black and Brown with the presence of small parts and scattered pale green.

The aim of this paper is to examine, in detail, the corrosion of the selected objects grown during the long-term burial and identify its products; this will help us to understand the corrosive factors and the degradation mechanisms, as well as to identify their constituting metals in order to carry out scientific treatment and conservation.

For this purpose, samples from the objects were examined by Metallographic Microscope (ME) and Scanning Electron Microscope (SEM), while the corrosion products were analyzed by X-ray diffraction (XRD). X-ray fluorescence (XRF) was used to determine the bulk elements of the objects.

XRD data showed that the corrosion products are cuprite, atacamite and paratacamite, whereas XRF analysis pointed out that the anklets are composed by a bronze alloy. Microscopic examination reveals that the three anklets suffered deterioration mainly in spots. Exploiting the collected info, chemical cleaning was chosen for treating the objects.