ABSTRACT: This paper presents an analysis of a bead from third millennium BC levels of Jerablus Taitani, near Carchemish in Syria. The bead was found to consist of almost pure metallic antimony, with small amounts of lead, arsenic, copper and tin. Antimony objects are very rare in the archaeological record and very few analyses have been carried out. Until this paper, no description of the microstructure of such beads has been published. The paper goes on to discuss the probable sources of the antimony metal and the possible provenance of the bead itself.

Introduction

Prof Peltenburg of the Dept of Archaeology, Edinburgh, submitted a fragment of a tube bead from the site of Jerablus Taitani, near Carchemish in Syria, to the Research Laboratory for Archaeology for analysis. The bead, number JT1219, was uncovered in Tomb 787 which was found in Area IV, Level 4 of the site. Although disturbed, it had an assemblage of beads and pendants in layers thought to date to the same period as the Bead Level of Nineveh, that is to about 2300–2500 BC (Peltenburg et al 1996, 10 and Fig 10).

Analysis quickly showed that the bead was made of antimony. Objects of metallic antimony are very rare in the archaeological record. Very few analyses have been conducted and many of those that have are old, dating back to the 19th century. This paper presents one of the first analyses of an antimony bead using modern analytical equipment. It is also the only analysis yet published to give details of the microstructure of an antimony object, rather than just a bulk chemical composition. It goes on to suggest a how the object was made and discuss possible sources of the metal.

Experimental Method

A small piece of the bead was mounted in cross section in a resin block and polished for analysis in an SEM. The initial reconnaissance was carried out on a Cameca SU30 microprobe at the RLAHA, where the nature of the microstructure was explored. The analyses and elemental mapping were completed on the Jeol JXA 8800 multi-spectrometer machine in the Department of Materials, University of Oxford.

Results

Initially when the bead was submitted for analysis, it was thought that it was a ceramic bead coated in silver foil, but analysis quickly revealed that this was incorrect and the bead actually consisted mostly of antimony. Metallic antimony is an extremely brittle metal with a flaky, crystalline habit. It typically is bluish-white and has a metallic lustre, which tarnishes to black over time in air. The cross-section showed that the bead consisted of three main layers: an inner layer of ceramic, a middle layer of well-preserved metal and an outer layer of oxidized metal (see Figure 1).

Of greatest interest are the well-preserved metallic areas of the bead. The matrix of the bead (phase A) is 98.5% antimony with traces of arsenic, tin and lead (see Table 1). The clear microstructure is picked out by other phases that are concentrated in the grain boundaries of the matrix. The grainsize of the matrix is fine, usually around 20–30µm across, the edges of which are defined by a brighter, high-backscatter phase and a darker low-