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Comprehensive Physical Examination and Chemical Analysis of Selected Artifacts from the Off-shore Marine Archaeological site, Gulf of Khambat, INDIA

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A possible archaeological site was accidentally discovered in 2001 in the Gulf of Khambat (Cambay), off the west coast of India, by the scientists of National Institute of Ocean Technology (NIOT) while surveying marine pollution (1). The discovery was based on a number of sonograms of the seabed with geometrical shapes and markings suggesting that they could not be natural features. A variety of objects were collected from the site: potsherds, a couple of specimens of woody material and numerous objects of inorganic material. The latter appear to be consolidated sandy-clayey materials in various shapes and sizes. At a Workshop of scientists, archaeologists and historians held in 2002 recommendations were made to undertake a re-visit to the site for a more detailed examination, further collection of artifacts and a thorough investigation of the nature of these objects. The information generated will be useful when interpreting the dates obtained on woody samples, and the site regarded as of possible human habitation (2). An initial archaeological assessment was made based on available information (3).

In a collaborative project, selected samples of the inorganic objects provided by NIOT are being studied at Andhra University. These are being subjected to scanning electron microscopy (SEM) and whole-sample non-destructive neutron activation analysis (NAA). For an initial study, twelve specimens were selected from the 2002 batch of artifacts collected from the site. These consist of flat, wafer-shaped objects of varying shapes and thicknesses. The smaller specimens range from 15 to 28 mm at the largest dimension and 2 to 4 mm thick and the larger specimens range from 37 to 45 mm at the largest dimension and 6 to 8 mm thick. Four of the specimens have a 2 to 4 mm circular hole.

This paper gives the preliminary results of SEM and NAA studies. SEM examination of size, shape and mineralogy of the grains and cementing material are described. Information from scanning electron microscopy of the mineral grains, clay particles and the nature of cementing material is described. The origin of circular holes is discussed.

Non-destructive "whole specimen" NAA was intended to generate qualitative elemental profiles and semi-quantitative abundance data for the specimens. A preliminary assessment of the mineralogical assemblage and environment of deposition is made based on the data. The findings help place limitations on the chemical and mineralogical nature of the specimens and their possible mode of origin. *Work is still in progress.*

References

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