



## **Advanced surface science techniques for characterization of Chinese bronzes**

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The appearance of an ancient Chinese bronze as seen today is attributable to its original surface finish and the effects of time. Some of the surface variations have been caused by deliberate damage, corrosion reactions during burial, and mechanical and chemical processes performed by dealers, restorers and art conservators after excavation. A thorough examination of several bronze artifacts using visual, technical and scientific instruments can reveal more specifically what has occurred over time. Generally, the corrosion mechanisms vary considerably from one bronze to the next, and sometimes have more than one type on a single vessel. The amount of corrosion can be influenced by the degree of surface finish and the alloy composition. In this paper, the use of analytical surface science techniques (Scanning Electron Microscopy, Energy Dispersive Analysis with X-rays and X-ray Photoelectron Spectroscopy) to provide a better understanding of the artifact's alloy composition, scales, corrosion products and subsequent processing will be discussed in terms of their relevance to the study of ancient Chinese bronzes.