A COMPREHENSIVE STUDY ON THE "YOHEN TEMMOKU" FROM THE JIAN KILN OF CHINA

Weidong Li
Shanghai Institute of Ceramics, CAS; liwd@mail.sic.ac.cn

Introduction

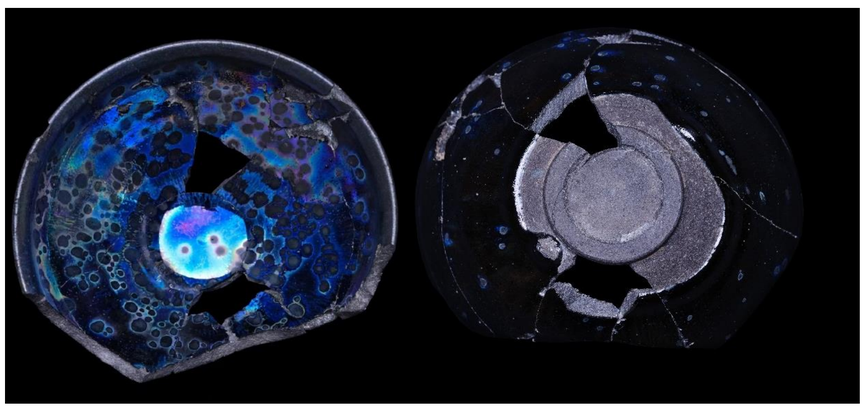
"Yohen Temmoku" is recognized as the best black-glazed tea bowl from China's Jian kiln, and its production process has long been an unsolved mystery. In 2009, shards with the characteristics of "Yohen Temmoku" were discovered at the site of Southern Song Lin'an Imperial City. Nineteen shards were spliced into an incomplete tea bowl, which was recognized as the fourth "Yohen Temmoku" existing in the world, and became the research object of this work. Various nuclear techniques, as well as methods based on electron microscopy and optics, were used to promote the understanding of "Yohen Temmoku" from the perceptual level to the scientific level, and to decipher its production process and color mechanism.

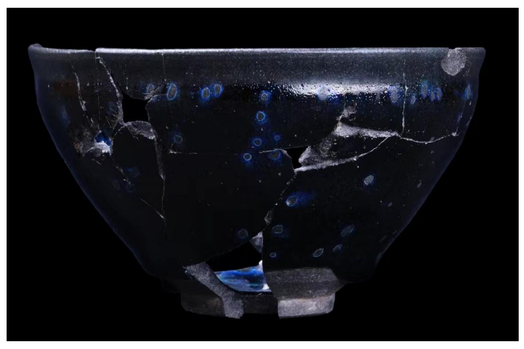
Conclusions

The analysis results obtained through various techniques corroborate each other, leading to a logically coherent chain of evidence. The findings indicate that the "Cores" were painted to the inner and outer surfaces of the black-glazed tea bowl using a soft brush after the first high-temperature firing. These "Cores" belong to overglaze silver color decoration and contain Ag and Pb. The "Yohen Temmoku" Bowl shows no surface crystallization of iron oxides, ruling out the possibility of chemical or physical coloration due to crystallization. The iridescent color originates from the composite structure of "Pb-Al-Si glass film + Ag microspheres" on the glaze surface, which is a structural color and results from physical coloration. During the second lower-temperature firing, the evaporation and deposition of the material for "Core" painting led to the formation of the film-microsphere composite structure. The inner wall, with more evaporation sources, formed a larger area of the film-microsphere composite structure, corresponding to a broader iridescent color area. In contrast, the outer wall had very limited evaporation sources from the minimal "Cores", resulting in color only around the periphery of the "Core". Both the first and second firings of "Yohen Tenmoku" were conducted in a heavily reducing atmosphere.

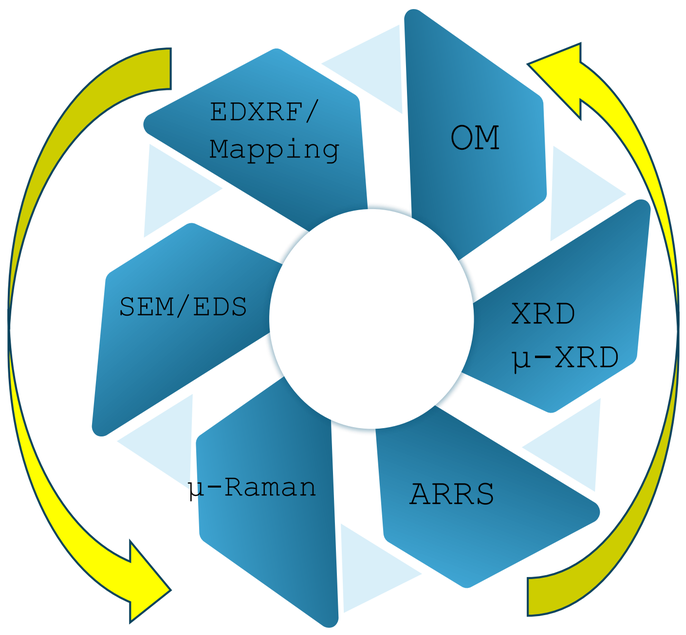
Reference

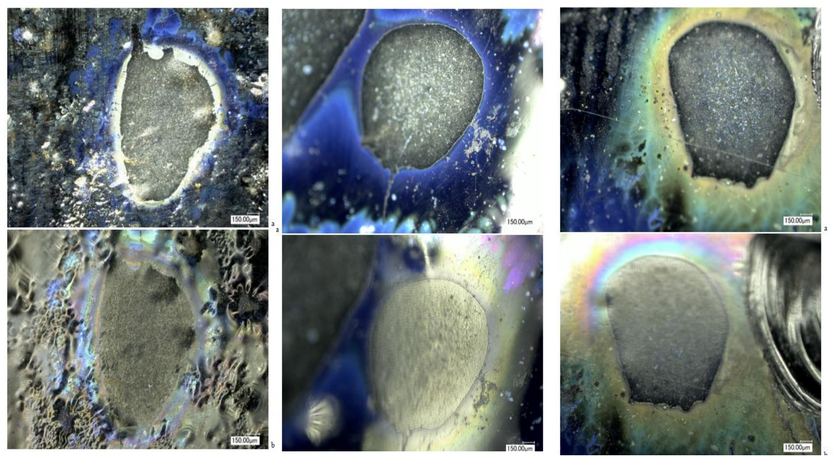
Weidong Li, Xiaoming Fang. A Study on the "Yohen Temmoku" from the Jian Kiln, Shanghai Science and Technology Press, 2023.



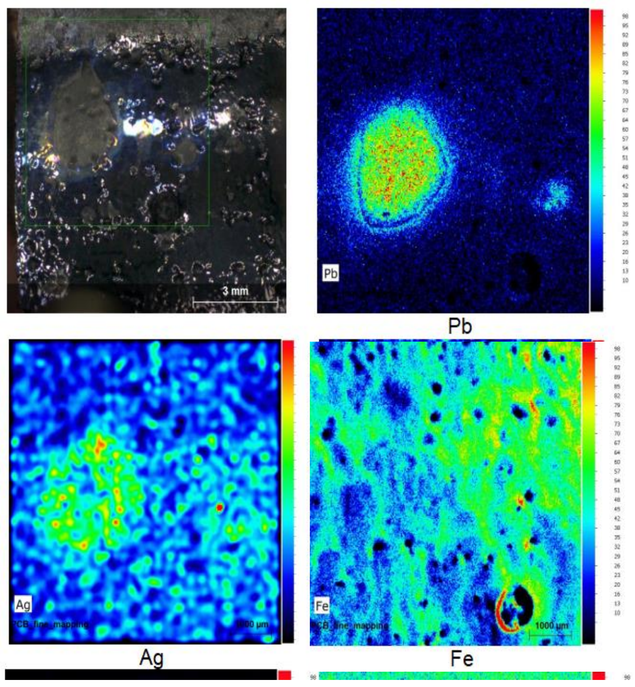


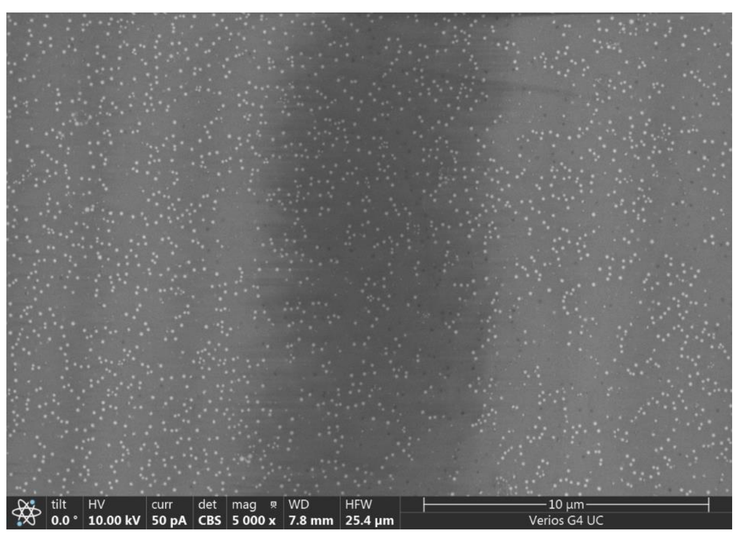
"Yohen Temmoku"





"Halo": Iridescent Ring around a "Core"





SEM: Pb-Al-Si glass film-Ag microsphere structure