

Magnetic and Chemical Characterization of Black Pottery from Hanseong Baekje Archaeological Site, South Korea

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The black potteries unearthed from the Hanseong Baekje archaeological site, Seoul, South Korea have been characterized through microscopy, X-ray diffractometry, SEM-EDS, organic elementary analysis and Mössbauer spectroscopy. In result, samples were classified into type I (black burnished pottery with black surface and black to dark gray matrix), type II (black burnished pottery with black surface and brownish matrix), and type III (black soot coated pottery). There was no difference in the mineral and major element composition of the black color development part and the raw material soil part for each sample. On the other hand, differences in carbon content and magnetic properties reflect its own characteristics of each type and part of sample. Type I and type II have significantly lower or no carbon content and higher magnetic iron oxide rate than type III. These results helped in distinguishing the mechanisms for black color development between black burnished pottery (reduction firing) and black material coated pottery (soot coated firing in oxidized atmosphere). Moreover, the black to dark gray matrix of type I was determined to contain the higher amount of magnetic iron oxide than the brownish matrix of type II. These results indicate that iron oxide transformation from non-magnetic to magnetic in the raw material soil influences the development of black color on the surface. And also suggest that the pottery type with a black to a dark gray matrix estimated that produced through more intense and prolonged reduction firing than the type with the brownish matrix.

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