

Analytical study for raw materials of red pigment and manufacturing techniques in the Red Burnished Pottery

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The Red Burnished Pottery is special among pottery excavated from ancient archeological sites along with the Black Burnished Pottery. In particular, Red Burnished Pottery, made in the Neolithic and Bronze Ages, is meaningful in that it uses red mineral pigments obtained from nature on the upper layer of the body, and uses burishing techniques. When the red layer of pottery is observed using a microscope, the red layer of the Neolithic pottery is more uneven and thicker than that of the pottery of the Bronze Age. Therefore, it cannot be adhered to the body and cracks are generated in the pigment layer. In addition, when the color difference was measured and compared, the degree of redness (a^*) was higher in Bronze Age pottery than Neolithic pottery. As a result of estimating the raw material of the pigment used in the red layer using XRD analysis and Raman spectroscopy, it was confirmed that it was hematite (Fe_2O_3). In addition, through the analysis of the phase transition of the constituent minerals of the pigment colored layer, it was found that the firing temperature was in an oxidizing environment of 800 °C or less. There is a record that lacquer (sap of the lacquer tree) was used to attach a red pigment to the soil to create such a red layer. Therefore, as a result of FT-IR analysis and Py-GC-MS analysis, natural organic adhesives such as lacquer were not detected, so the possibility of use could not be confirmed. In the future, if Mössbauer spectroscopy analysis of the raw materials of the pigments used for coloring the red layer by period and region, it is expected that the homogeneity of the used raw materials can be more accurately identified.

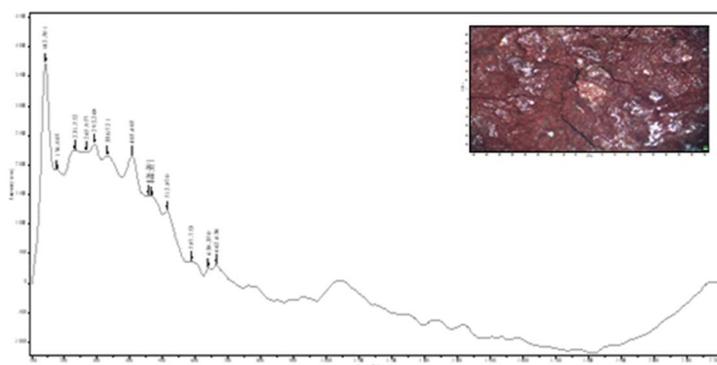


Fig. 1. Raman peak of red pigments layer in excavated pottery

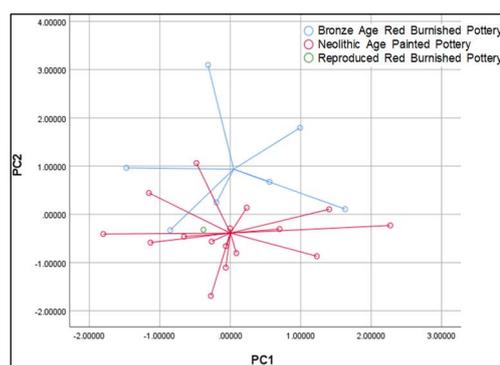


Fig. 2. Score center value of red pigments

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