

MÖSSBAUER SPECTROSCOPIC AND CHROMATICITY ANALYSIS ON THE COLOURATIVE MECHANISM OF ANCIENT GORYEO CELADON FROM GANGJIN AND BUAN*

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In ancient Goryeo celadon excavated from the kiln sites in the GangJin and Buan areas, the effect of the chemical composition and ionic state of Fe on the colour was evaluated by Mössbauer spectroscopy and chromaticity analysis. According to chromaticity analysis, the L^ value (brightness) of the glaze was shown to be affected more by TiO_2 and MnO than by Fe_2O_3 , and the body was affected more by Fe_2O_3 than by TiO_2 . The a^* value was found to be affected by Fe_2O_3 and TiO_2 in the glaze, whereas there was hardly any change in the body according to the composition. As for the b^* value, changes due to the composition were shown to be smaller than those for the L^* and a^* values. According to the Mössbauer spectroscopy results, as the quantities of TiO_2 and Fe_2O_3 are increased, Fe^{2+}/Fe^{3+} decreases; while the changes in Fe^{2+}/Fe^{3+} with MnO and P_2O_5 are negligible. As the quantity of Fe^{2+}/Fe^{3+} increases, the a^* and b^* values decrease, which results in the change of colour from red–yellow to blue–green. The characteristic green colour can be attributed to increased L^* (brightness) and decreased a^* and b^* values (blue–green shift) due to the reduced Fe ion, which is mainly determined by the TiO_2 and Fe_2O_3 contents.*

KEYWORDS: CELADON, PORCELAIN, MÖSSBAUER SPECTROSCOPY