Scientific Study on the Surface Treatment of Kobans, Gold Coins Issued in Edo Period

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I researched the actual status of “iroage”, the surface treatments conducted to kobans which were minted in Edo period ten times, by Auger Electron Spectroscopic (AES) Analysis. The following conclusions were obtained from the studies for two kinds of keicho-koban, other koban correspond to minting seven times and man’en-nibuban: (1) Iroage had been conducted from the stage of keicho-koban whereas it was formerly thought to start from genbun-koban, (2) The thickness of iroage layers of the earlier minted koban was thinner and that of later ones was thicker, (3) The depletion of gold from the surface to 0.08-0.40 micrometer was observed except genbun-koban. They were possibly the results of selective sputtering and the sputtering yield for silver was larger in the alloy of gold and silver, (4) The substance of “kunroku” used as one of the chemical for iroage had not been known formerly. The proper kunroku were resin of frankincense, olibanum, mastiche or mixture of them. However the kunroku used for koban in Edo period was thought to be amber.

Key words: Edo period, gold coin, surface treatment, Auger electron spectroscopic analysis, resin