


Object Number	K451	Description	Pyramid-fitting in gold with garnet and glass cloisonné decoration. Catalogue no. 578.
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	Sample Description and location.
	Sample collected from crusty material inside pyramid. Mixture of black and sandy coloured crusty material. Sub-sample K451-1-7 is black material at image centre.

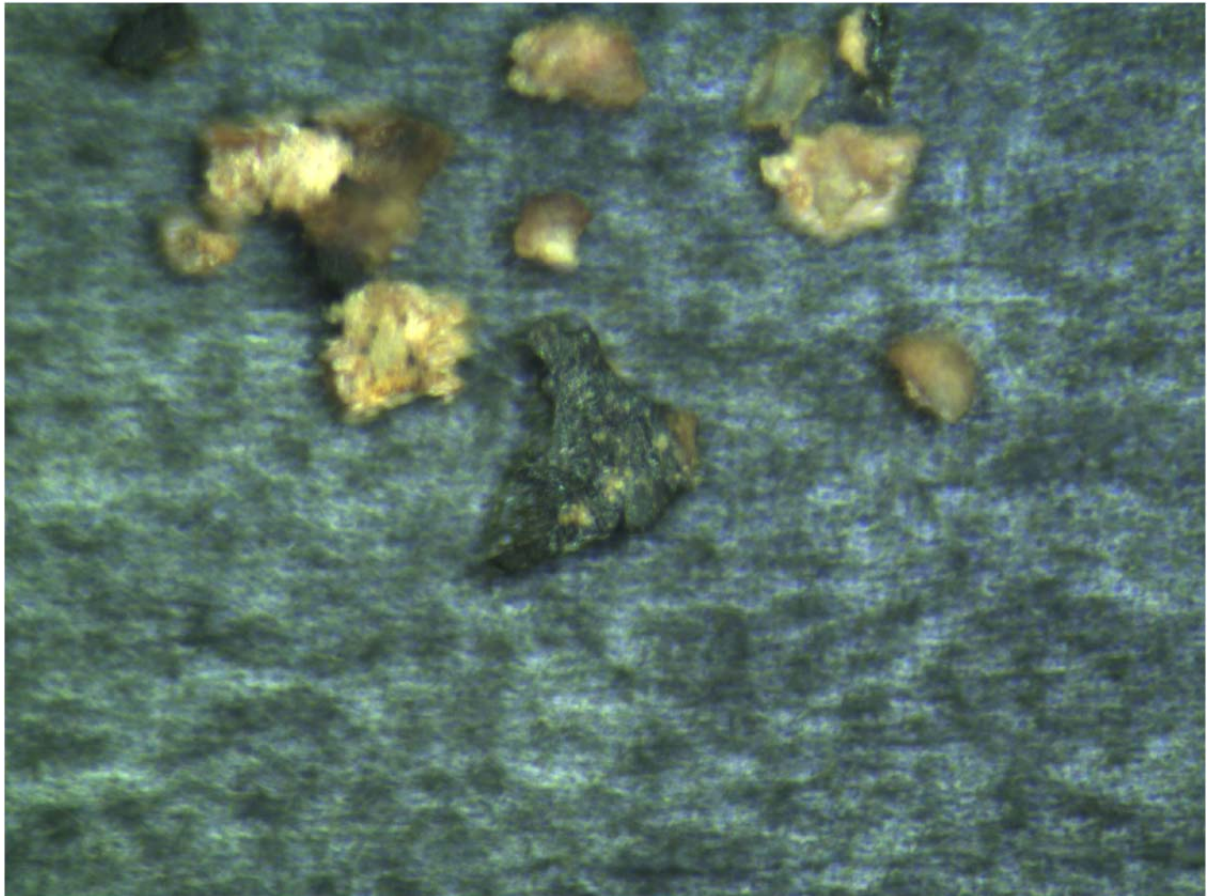


Figure 1. Image showing sample K451.

FTIR Analysis

Comments: Spectrum K451-1-7 (top blue) is a proteinaceous material with Amide I, II, and III bands between 1350 and 1700 cm^{-1} and the N-H stretching band centred around 3350 cm^{-1} . The sample is a close spectral match Oxidised Horse Hair (bottom, green). Deteriorated horn would have a similar spectrum to that of oxidised hair (bottom, green spectrum) as they are both keratin based materials with deteriorated cysteine cross linking molecules. SEM analysis recommended to confirm micro structure. The FTIR spectrum for horn exhibits peaks for amide I (C=O stretching) between 1700 and 1600 cm^{-1} , and amide II (CN stretching and NH bending) between 1560 and 1500 cm^{-1} , a sharp, broad band centred at around 3300 cm^{-1} related to N-H stretching. A doublet between 3000 and 2800 cm^{-1} relating to C-H stretching of methylene groups are characteristic of keratinous proteinaceous materials. (Welsch et al. 2012, Kennedy et al. 2013, Mansilla et al. 2011, Derrick et al. 1999). In oxidised keratinous materials an intense peak at about 1030 cm^{-1} is attributable to S=O bonding in cysteic acid. (Welsch et al. 2012, Kennedy et al 2013, Mansilla et al. 2011).

Representative Spectrum

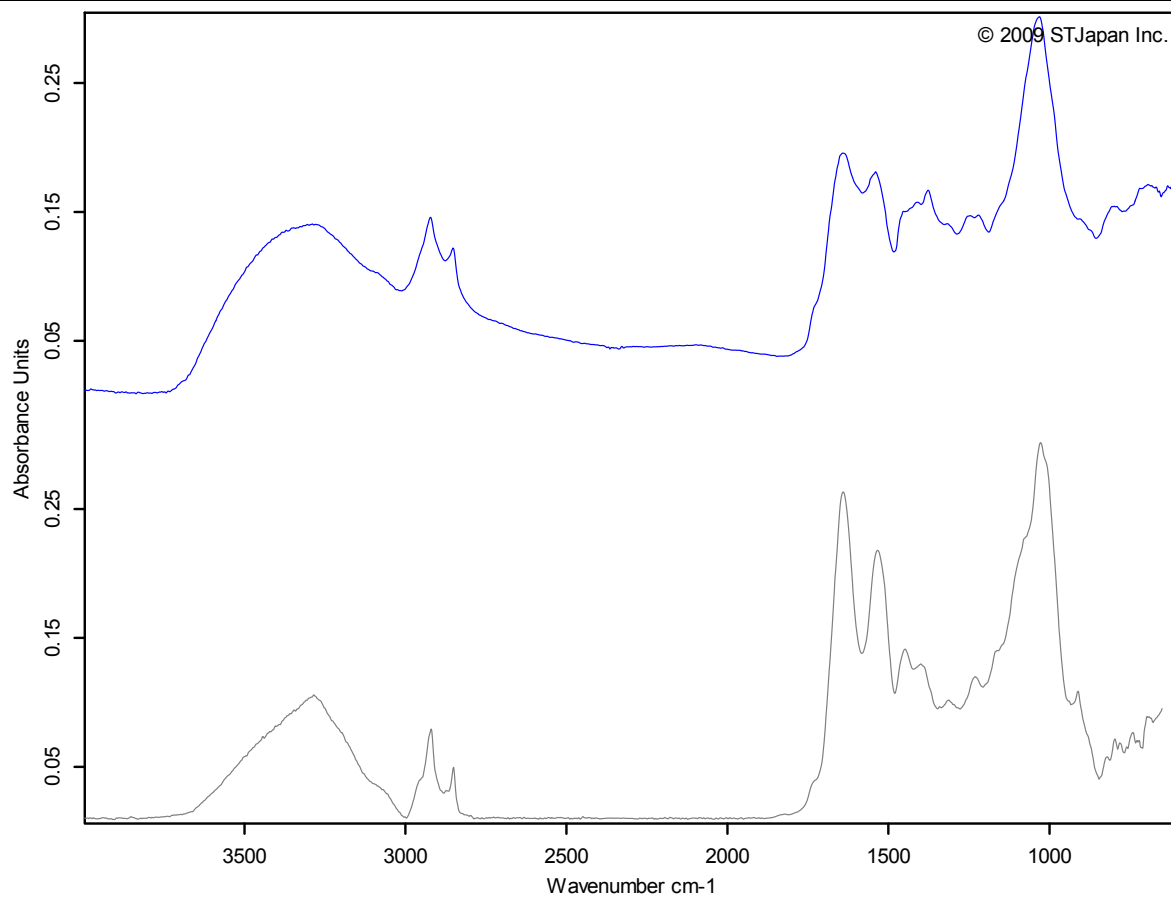


Figure 2: Top (blue) K451-1-7. Bottom (grey) Oxidised horse hair reference spectrum, ST Japan 2009.