


Object Number	K679	Description	Hilt-collar in gold, of narrow form, combining a band of filigree and a band of garnet cloisonné. Catalogue no. 157.
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	Sample Description and location.
	Section of suspected amber repair material tested in situ.

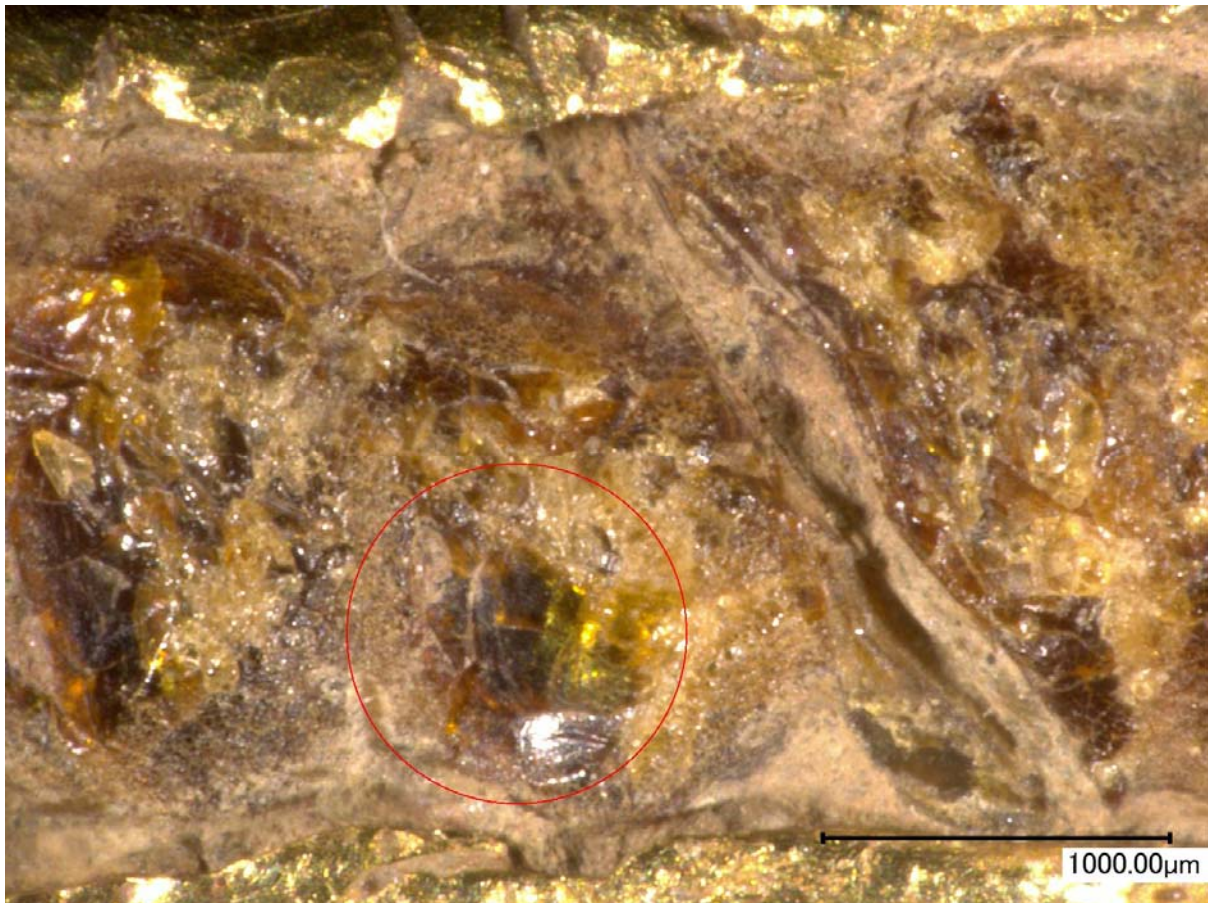


Figure 1. In situ analysis region for K679-1.

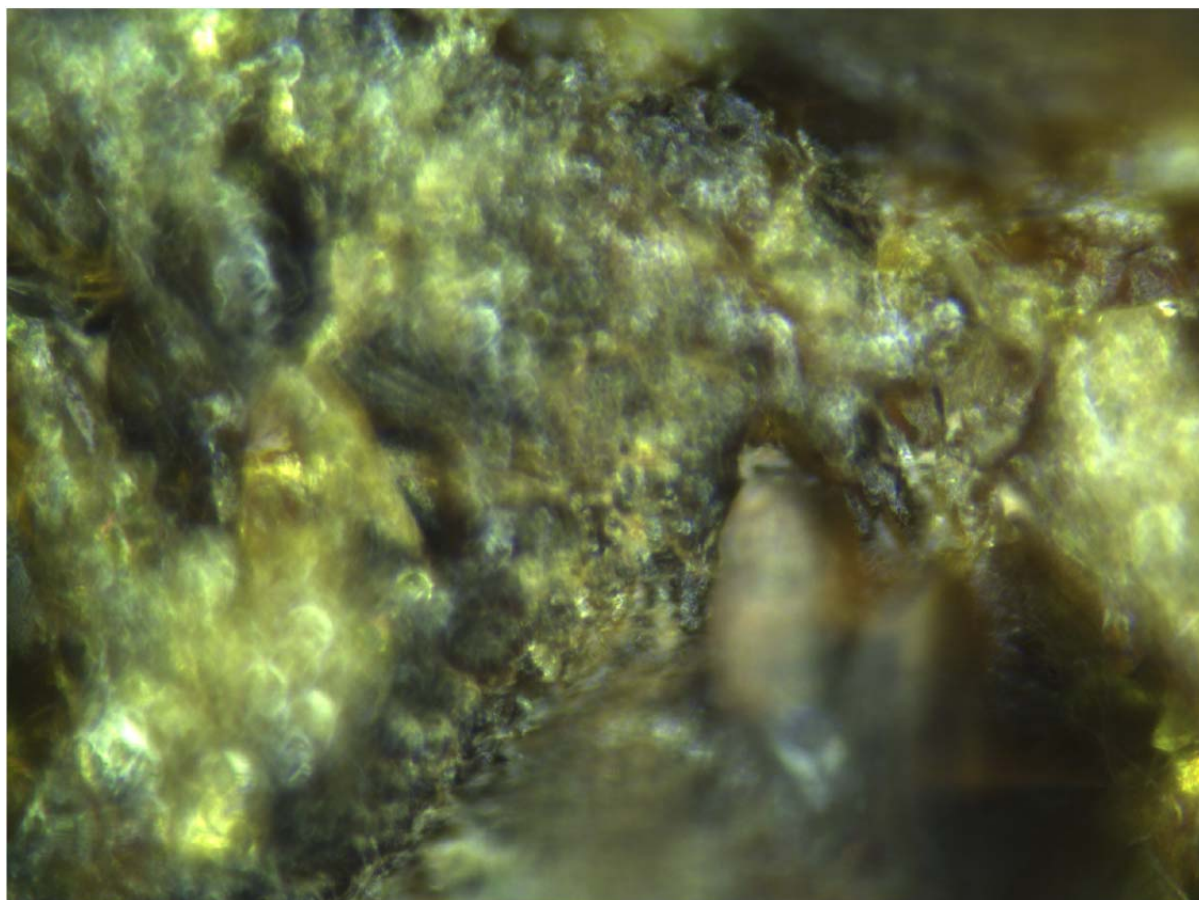


Figure 2. Detail of sub-sample K679-1-5 FTIR analysis point

FTIR Analysis

Comments: Spectrum K679-1-5 (top, green) is a close spectral match for that of the reference sample for Amber (below, blue). Amber spectra exhibit a broad band between 3600-3500 cm^{-1} due to O-H stretching of alcohols, and aliphatic C-H stretching and corresponding C-H bending bands between 3200 and 2800 cm^{-1} , and 1500-1300 cm^{-1} respectively. The asymmetric C-H stretch of the methyl (shoulder at 2963 cm^{-1}) and methylene groups (peak at 2926 cm^{-1}) occurs at a slightly higher frequency than the symmetric vibrations of the methylene groups (2856 cm^{-1}) (Trucia et al 2014, Murillo-Barroso & Martinon-Torres 2012). An asymmetric band between 1800 and 1600 cm^{-1} is formed from a series of overlapping C-O stretching peaks originating from esters at 1785 cm^{-1} , ketones at 1746 cm^{-1} , and two carboxylic acid groups at 1695 cm^{-1} and 1649 cm^{-1} (Trucia et al. 2014). Much emphasis has been placed on the so called 'Baltic shoulder' region in FTIR analysis of amber within the archaeological literature. A sharp peak between 1160 and 1150 cm^{-1} relates to C-O bonding in diethyl succinate, the ester of succinic acid, the precise location of which is influenced by the C=O (double) bond in this compound (Murillo-Barroso & Martinon-Torres 2012). The Baltic shoulder on this peak appears between 1250 and 1175 cm^{-1} , and was at one time believed to be unique to amber from trees around the Baltic sea region. More recent research indicates that while the feature is almost always present in Baltic amber samples, it may also present in non-Baltic amber (Brody et al 2001, Murillo-Barroso & Martinon-Torres 2012, Caldoraro et al. 2013). An additional peak at approximately 1000 cm^{-1} obscures part of the amber spectrum and likely relates to silicate based material from the burial environment.

Representative Spectrum

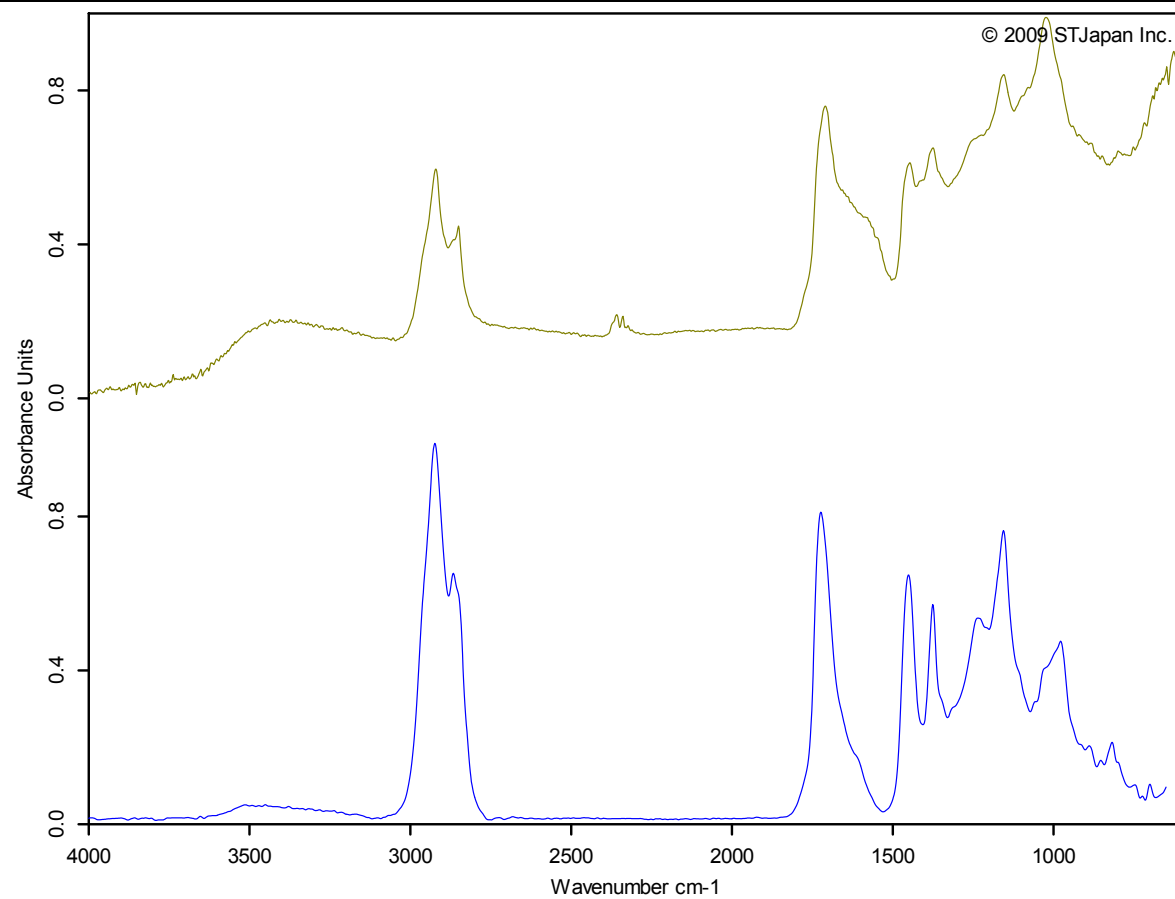


Figure 3. Top (green) spectrum for K679-1-5. Bottom (blue) Amber reference sample, ST Japan 2009.

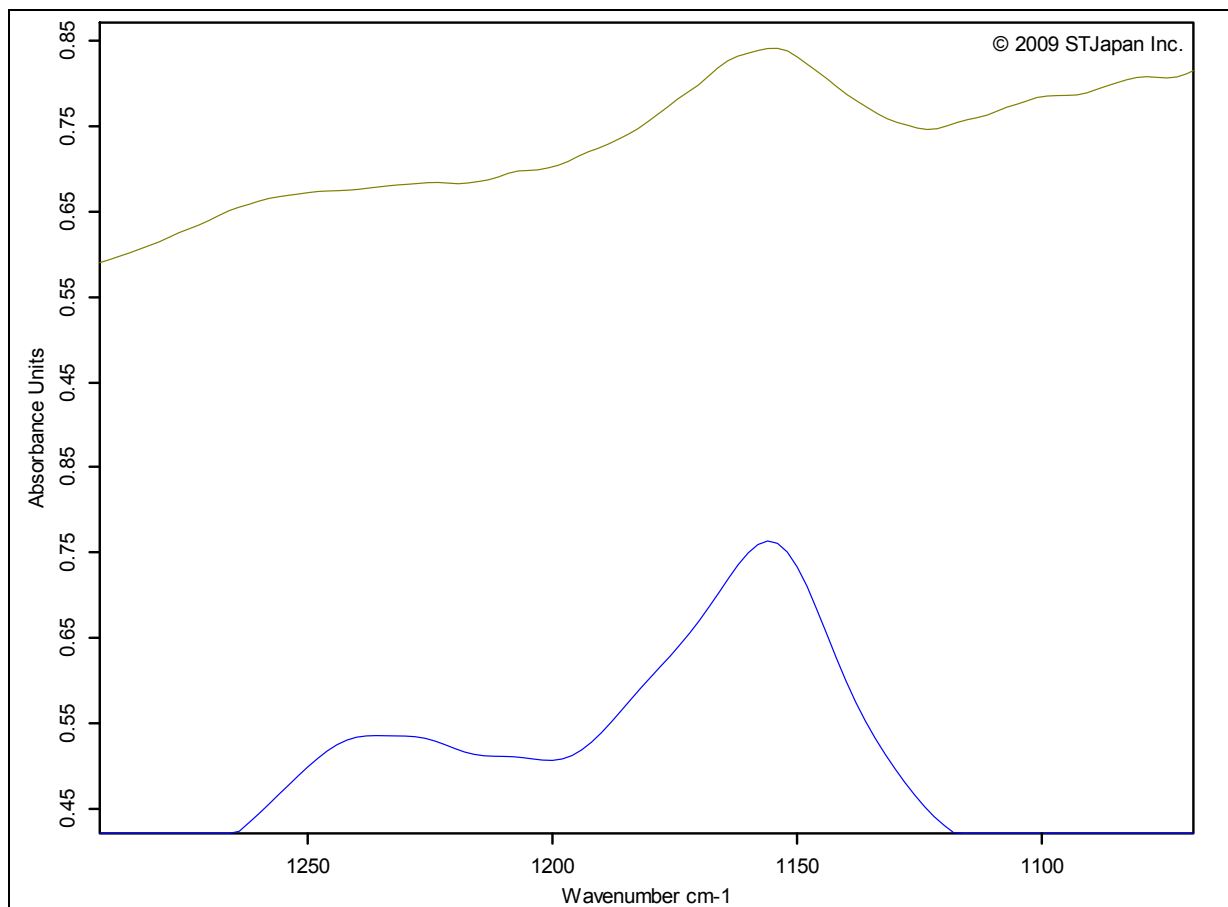


Figure 4. Detail of 1100-1250cm⁻¹ region of spectra showing subtle 'Baltic shoulder' on K679-1-5 (top, green), and on bottom (blue) amber reference sample, ST Japan 2009, between 1200 and 1250cm⁻¹.