


Object Number	K701	Description	Pommel in gold, of cocked-hat form, with filigree decoration. Catalogue no. 29.
		<p>Sample Description and location.</p> <p>Small sample of white material collected from inside pommel cap.</p>	



Figure 1. Sample K701-3 collected from woody material inside pommel cap (along bottom edge of image).

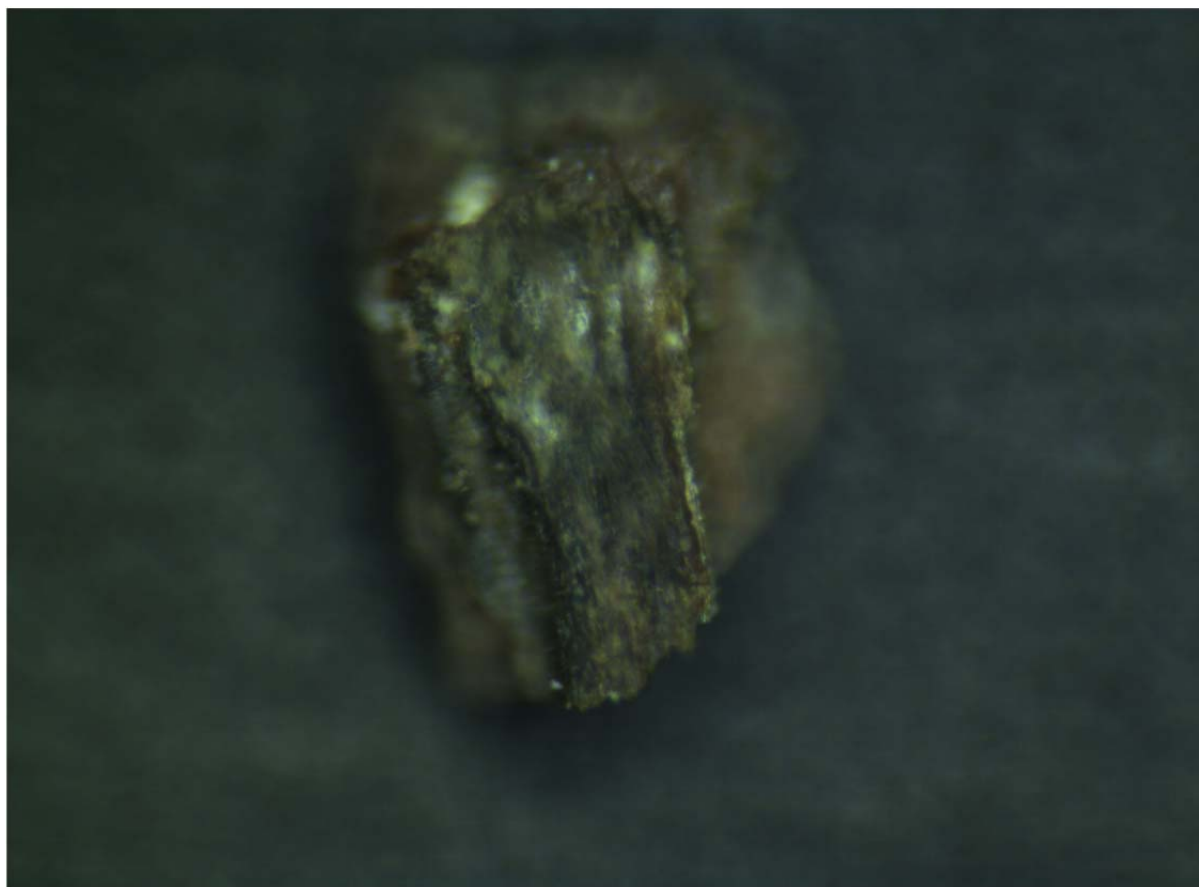


Figure 2. Detail of sub-sample K701-3-1 showing FTIR analysis location.

FTIR Analysis

Comments: Spectrum K701-3-1 (top, red) is a close spectral match for that of the reference sample for Egyptian Papyrus (bottom, blue), shown here as a generic comparison for cellulosic carbohydrate. FTIR spectra of different cellulosic plant materials are superficially similar and cannot be readily distinguished by eye (Garside & Wyeth 2003). In addition, degradation of one or more components of the plant material e.g. through oxidation of the cellulose molecule, will influence the position and intensity of spectral peaks relative to non-deteriorated reference spectra (Stuart 2007, Ciolacu *et al.* 2011).

There are, however, a number of fairly consistent spectral peaks indicative of cellulosic carbohydrate within a sample. The majority of cellulosic carbohydrates will exhibit a broad band from 3600–3100 cm^{-1} arising from O-H stretching in bound or absorbed water (Tipson 1968, Stuart 2007, Naumann *et al.* 2007, Bodirlau & Teaca 2009). A broad band relating to C-H stretching from aromatic hydrocarbons at 3100-3300 cm^{-1} can be obscured or partially obscured by the broad O-H stretching band described previously (Tipson 1967). Additional peaks relating to the cellulose component of plant material include peaks for C-H stretching of methylene groups between 3000 and 2800 cm^{-1} , C-H deformation in cellulose and hemicellulose at 1371 cm^{-1} , C-H vibrations at 1319 cm^{-1} , an intense peak at about 1030 cm^{-1} relating to C-O bonding (this is typically a combined peak for cellulose and hemi-cellulose), and a shoulder at 897 cm^{-1} relating to C-H bending. Additional shoulders at 1155 cm^{-1} and 1105 cm^{-1} on the C-O band at about 1030 cm^{-1} relate to stretching and contraction (so called 'breathing') vibrations within the benzene rings, and glycosidic linkages between carbohydrate molecules respectively (Tipson 1968, Naumann *et al.* 2007, Bodirlau & Teaca 2009).

Representative Spectrum

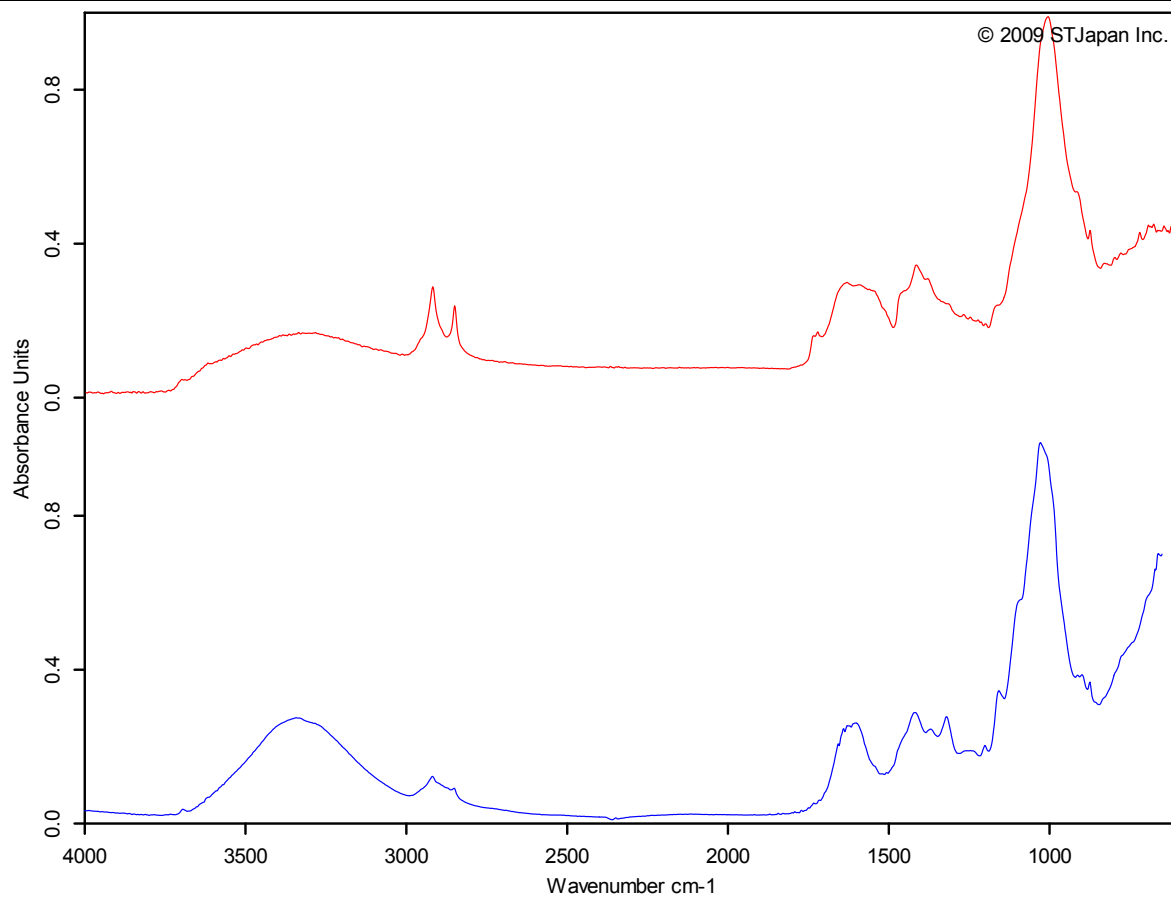


Figure 3. Top (red) spectrum for K701-3-1. Bottom (blue) Papyrus, Egypt reference sample, ST Japan 2009.