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CAEM 222
2/14/17
Midterm: Specialized photography for basketry

2011.024.002, a winnowing basket in the Agua Caliente Cultural Museum's collection, appears on initial inspection to be rather plain. This basket was crafted using juncus stem stitching elements and deergrass stalk foundation, with its only visible decoration being a wide band of red basal juncus stem stitches near the rim. However, during a routine examination using a handheld UV lamp, a technique more often used to detect previous conservation treatment (Alarcón et al 2012), a faint zigzag pattern appeared in the red band.

Initial UV-induced fluorescence photography. Although the decorative zigzags are visible in this initial photograph, they are extremely difficult to see.

Editing the UV fluorescence photograph helps with legibility, but the pattern is still unclear.

Seeing the presence of a more complex decorative scheme on this basket introduced a number of new questions. What was the original appearance of the decorations? What is their significance, if

any? How were they achieved? Can they be seen with more clarity by using other spectroscopic techniques? Are there other, similar baskets whose decorations have likewise gone unnoticed?

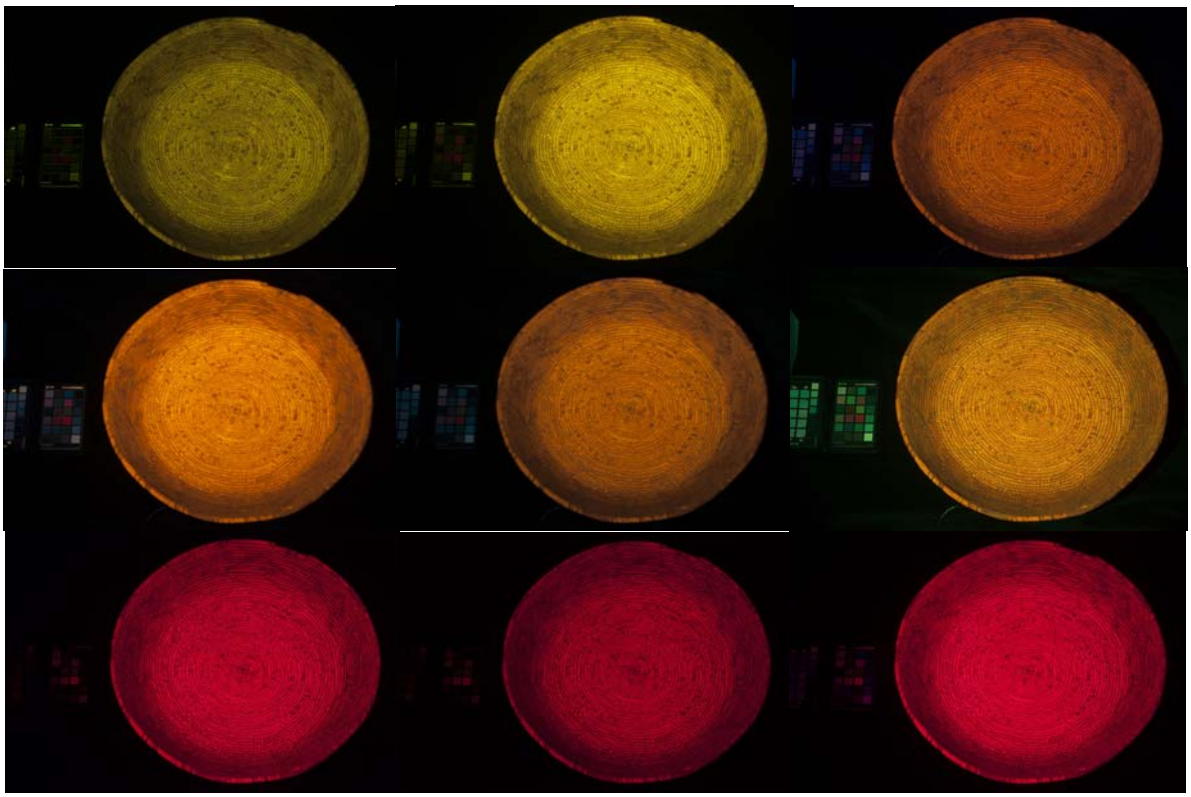
UV-induced visible (UV/Vis) fluorescence and visible-induced visible (Vis/Vis) fluorescence are phenomena which are both easy and cheap to exploit for conservation documentation. Each phenomenon occurs when light of a certain wavelength illuminates an object, causing certain materials to fluoresce (Janssens and Grieken 2004). UV/Vis fluorescence and Vis/Vis fluorescence may be induced by a variety of wavelengths, each of which results in somewhat different fluorescence behavior. Light source also plays a role: for example, a fluorescent-tube UV lamp will produce a different quality of UV energy than an apparatus such as a Mini CrimeScope®, which is specifically designed for UV/Vis and Vis/Vis fluorescence examination. Sources such as synchrotrons can produce even more precise results (Thoury et al 2011).

UV/Vis fluorescence photograph using Mini CrimeScope®. The greater intensity of the Mini CrimeScope® creates a more legible image of the zigzag decorations.

False-color composite image from UV/Vis fluorescence and visible light reflectance, showing possible appearance prior to fading.

UV/Vis and Vis/Vis fluorescence photography shows that a set of two-pointed zigzag lines repeats all the way around the rim of the basket. In all the images, the zigzags are darker than the band they sit in, which itself is darker than the main field of the basket. This variation in fluorescence

offers some clues as to the original color of the decorations. Since there seems to be a correlation between the brightness of fluorescence and the lightness of color, it may be assumed that the pigment in basal juncus quenches its fluorescence. Therefore, the redder the material the darker it will appear in fluorescence photography. In this case, the original decorations may be imagined as dark red/brown zigzags in a lighter red band against a field of pale juncus stem. During consultation, Rose Anne Hamilton, a modern Cahuilla basket weaver, tentatively identified these zigzags as wildcat or coyote tracks; it is hoped that dissemination of these fluorescence images to other Native weavers can provide more ideas as to the meaning of the decorations, as well as providing a more nuanced appreciation of Mary Largo's work.



Left to right from top: Vis/Vis fluorescence from excitation bands with peaks at: 415nm, 445nm, 475nm; wide band emission λ<475nm, 495nm, 515nm; 535nm, 555nm, wide-band emission λ<575nm. Each excitation band produces slightly different fluorescence behavior.

Sources:

Alarcón, Tessa De, Robin O'Hern, and Ellen Pearlstein. "Case Studies in Basketry Repair: Two Abenaki Splint Baskets." *Journal of the American Institute for Conservation* 51, no. 2 (2012): 123-143.

Janssens, Koen, and René Van Grieken, eds. *Non-destructive micro analysis of cultural heritage materials*. Vol. 42. Elsevier, 2004.

Thoury, Mathieu, Jean-Philippe Echard, Matthieu Réfrégiers, Barbara Berrie, Austin Nevin, Frédéric Jamme, and Loïc Bertrand. "Synchrotron UV− Visible Multispectral Luminescence Microimaging of Historical Samples." *Analytical chemistry* 83, no. 5 (2011): 1737-1745.