

CHARACTERIZATION OF DYED PEARLS BY FT-IR SPECTROSCOPY AND FT-RAMAN SPECTROSCOPY

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ABSTRACT

Pearls are one of the popular organic gems due to the beauty of its natural lustrous and iridescent surface. Since the color of pearl is a factor account for their high price, color treatments of pearls were performed to create different shade of colored pearls. In the present investigation, FTIR and Raman spectroscopy were employed for differentiating the naturally-colored cultured pearls and dyed cultured pearls. White freshwater pearls were dyed with different concentration of silver nitrate solution. The dyed pearls show different shade of overtone color. For FTIR spectroscopy, ATR and DRIFT techniques show unique characteristic bands of pearl depending on the nature of sampling process. However, the techniques cannot use for differentiating between untreated and dyed pearls. The absorption peak of 841, 1083, 1461 and 1441 cm^{-1} are observed in both naturally-colored and dyed pearls, which verify that they are CaCO_3 with aragonite structure. Raman spectroscopy utilize for identification of dyed pearls. The Raman spectra of dyed pearls show a distinct peak at 570 cm^{-1} which corresponding to Ag-O of silver oxide on dyed pearl's surface.

KEYWORDS: Pearl, Dyed pearl, Black pearl, FTIR spectroscopy, Raman spectroscopy