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Raman and infrared studies of synthetic Maya Blue pigment

LAYRA REZA, FELICIA MANCIU, Physics Department, University of Texas at El Paso, ALEJANDRA RAMIREZ, RUSSELL CHIANELLI, Materials Research and Technology Institute, University of Texas at El Paso, El Paso TX 79968 — A fascinating aspect of *Maya pigments* is that despite the environmentally harsh humidity and high temperatures they resist fading and they have unprecedented stability. In this investigation, we address the question of how organic dye binds to inorganic palygorskite to form a pigment similar to *Maya Blue*. We also address how such binding might be affected by varying the proportion of dye relative to that of the mineral, and by varying the length of heating time used in preparation of the pigment. Our analysis by Raman and infrared absorption spectroscopies proves the partial elimination of the selection rules for the centrosymmetric indigo, and shows the disappearance of the indigo N-H bonding, as the organic molecules incorporate into palygorskite material. Infrared data confirm the loss of zeolitic water and a partial removal of structural water after the heating process. Evidence of bonding between palygorskite and indigo through oxygen is revealed by both spectroscopic measurements.

Layra Reza
University of Texas at El Paso

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