

INORGANIC SEMINAR

Tuesday, February 27, 2024

12:30 PM, BRWN 4102

“Investigation of 15th Century Paintings using Modern Chemistry Techniques”



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Abstract: Modern research techniques can paint a more comprehensive picture of the techniques and materials used in 15th century paintings. Using non-invasive analytical techniques, microsamples of different paint layers may be used to determine the composition of various pigments. In one example, a white primer layer from the Mona Lisa was found to consist of an oil containing high contents of lead. The isolation of various lead compounds, including plumbonacrite ($\text{Pb}_5(\text{CO}_3)_3\text{O}(\text{OH})_2$), through x-ray powder diffraction (XRPD) and Fourier transform infrared spectroscopy (FTIR) enabled scientists to understand the preparation and methods for obtaining this specific pigment. Knowledge of these methods is critical in the preservation of historic artwork since colored pigments often utilize a variety of other metals which may be impacted by exposure to ambient conditions. For instance, the common practice of using copper acetate and copper resonates to achieve green colored paints was abandoned due to an irreversible darkening of the paint over time. Electron paramagnetic resonance (EPR) and optical absorption spectroscopy (OAS) reveal the mechanism behind the effect of light and oxygen has on shifting ligand-to-metal charge transfer (LMCT) and the formation of new copper dimers.



Department of Chemistry

Seminar time will be shared with Prakhar Gautam