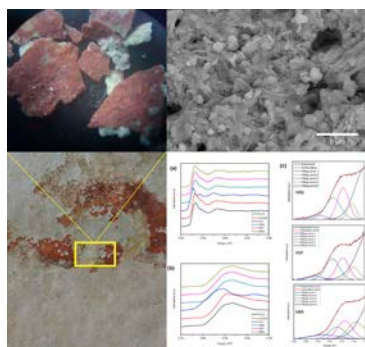


# Physicochemical Identification Based Synchrotron Radiation of Prehistoric Pigments in Tewet Cave, Sangkullirang-Mangkalihat Site, Borneo Island-Indonesia

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Rock art research based on Uranium-series dating of calcium carbonate deposits in Indonesian Borneo Island showed that rock art emerges at around the same time as the earliest forms of artistic expression appear in Europe (45,000–43,000 calibrated years bp) [1]. Tewet cave, one of limestone cave in East Borneo Island, possessed negative hand stencils in reddish to purple hues that can be investigated the chemical and mineralogical composition of pigments. The scientific approach using Synchrotron based X-Ray characterization (X-Ray Diffraction and X-Ray Absorption Near Edge Structure) and further analysis using X-Ray Fluorescence, Scanning Electron Microscopy and Fourier Transform Infrared would give better understanding of pigment origin used of rock art in Indonesia. The results of this research indicated haematite was main composition in pigment with gypsum and calcite were primarily mineral in substrate. The difference of hues between the samples were caused by different average particle sizes of the mineral pigment. The larger particles absorbed longer light wavelength and scattered shorter light wavelength that will appeared as purple, as smaller particles generated reddish hue. Purple hue that produce by larger particle size occurred by heating treatment of pigment source as evidence from younger period of Pleistocene [2].



**Figure 1:** Optical properties of reddish hue of hand stencil in Tewet Cave, Indonesian Borneo Island (a) 40x magnification (b) 5000x magnification from (c) hand stencils figure on site; with (d) XANES spectra of Tewet cave pigments.

## References

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