# RAMAN SPECTROSCOPIC ANALYSIS OF ART AND ARTEFACTS OF RELEVANCE TO THE PRESERVATION OF CULTURAL HERITAGE

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The major advantages of the adoption of Raman spectroscopy for the analysis of artifacts and works of art are two-fold : the technique is nondestructive and requires little or no chemical and mechanical pretreatment of the specimen , and the molecular signatures from both the organic and inorganic components are obtained in the same spectrum , hence affording the opportunity for assessing the interactions and relative stabilities to chemical , biological and environmental changes operating on the specimen [1,2].

In this paper the results of several selected case-studies that have been undertaken in collaboration with archaeologists , art historians and conservation scientists will be presented to illustrate the use of analytical data derived from Raman spectroscopic applications in the following scenarios:

Biodegradation of rock art : Altamira Cave , Spain and the Pecos Culture , USA .

Restoration of mediaeval and Renaissance frescoes : Sahagun and Valencia , Spain.

Corroboration of the discovery of a Raphael “Madonna and Child” painting.

Restoration of a badly-damaged , historic marine textile : the foretopsail of HMS Victory from the Battle of Trafalgar.

Identification of localized biological attack on human mummified and skeletal remains from diverse burial environments : Egyptian mummies , ice-cave mummies , a Brazilian sambaqui and the $6^{th}/7^{th}$ Century monastic Towyn-y-Capel grave site.

Novel discoveries –rewriting the history books : Roman wall-paintings .

## References

[1] H.G.M. Edwards, Chapter 5 , Case Study: Prehistoric Art , in Raman Spectroscopy in Archaeology and Art History , eds. H.G.M. Edwards and J.M. Chalmers , Royal Society of Chemistry , Cambridge , UK , pp.84-96 , 2005.

[2] H.G.M. Edwards , Raman Spectroscopy in the Characterisation of Archaeological Materials , in Handbook of Raman Spectroscopy : From the Research Laboratory to the Process Line , eds. I.R. Lewis and H.G.M. Edwards , Marcel Dekker , New York, pp.1011-1044 ,2001.

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