

## **DEAD SEA SCROLLS: MATERIALS CHARACTERISATION BY MEANS OF IR-ERS AND SYNCHROTRON BASED $\mu$ -FTIR SPECTROSCOPY**

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Characterization of material by conventional IR techniques is often limited by the thickness of the material under study. Therefore it can be only rarely applied non-destructively in the real world of cultural heritage when sampling is undesirable. In this presentation we demonstrate that specific problems can be solved by means of infrared external reflection spectroscopy (IR-ERS)

In the case of the conservation and long-term preservation of the Dead Sea Scrolls, knowledge of the previous treatments and their effect is of paramount importance. We present here the first results of a non-invasive spectroscopic method based on IR-reflection for *in situ* identification of conservation and protection treatments applied in past to scrolls. For this purpose several reference samples have been prepared and analysed.

The results show that the complex optical reflectance phenomena of layered materials can be interpreted and the nature of compounds present identified (waxes, polymers, oils, inorganic materials etc.), despite the overlapping with collagen reflectance bands in the spectra.

Furthermore, an inscribed fragment of Genesis Apocryphon was studied by means of synchrotron based  $\mu$ -FTIR spectroscopy (SyFTIR) to identify the organic material used as the binder for the ink.