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ORGANISMO DI RICERCA DELLE CAMERE DI COMMERCIO DI NAPOLI, PISA E VICENZA
NAPOLI – SANTA CROCE SULL'ARNO (PI)

Advanced approaches in leather research using X-Ray probe equipped SEM microscopy

Florio C., Naviglio B., Calvanese G.

Early microscopy techniques, such as optical, or the former electronic microscopy techniques, were widely utilised in leather research, mainly as an initial approach, or as additional tool to obtain useful information. Throughout the ages, the developments reached in microscopy technologies have allowed their utilisation as the main, determining tool to get results in many research fields. The modern scanning electron microscopy (SEM) technique that we have utilized in leather research, was equipped with an X-ray probe for the microanalysis of the samples and has resulted in being the most required, versatile tool in many applications: hair characterisation, characterisation of microorganisms involved in leather damage, investigations on leather defects and their causes, finishing characterisation, surface treatment studies, diagnostic investigations of historic leathers for their value and conservation. In the majority of these applications a very small portion of sample was available for the analysis. In spite of this, the technique gave comprehensive results and was able to solve the most problematic cases of leather damage that we investigated. Particularly, SEM microanalysis is considered to be 'non-destructive' indeed, as X-rays generated by electron interactions do not lead to volume loss of the sample, so it is possible to analyze the same materials repeatedly. The study provided much interesting feedback, reinforcing our knowledge on all the topics dealt with.

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Sede Legale e Operativa: Via Nuova Poggioreale, 39 - 80143 Napoli - Tel. 081 5979100 Fax 081 265574 Email: ssip@ssip.it
Sede Distaccata: Via S. Tommaso, 119 - 56029 S. Croce s/Arno (PI) – Tel 0571 32542 fax 0571 31785 Email: santacroce@ssip.it
Pec: stazionesperimentaleindustriapelli@legalmail.it - Cod.Fisc. e P.Iva 07936981211
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