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AN ANALYSIS OF THE BLACK CRUSTS FROM THE SEVILLE CATHEDRAL: A CHALLENGE TO DEEPEN THE UNDERSTANDING OF THE RELATIONSHIPS AMONG MICROSTRUCTURE, MICROCHEMICAL FEATURES AND POLLUTION SOURCES

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The Cathedral of Seville (Spain) suffers, like most of the historical buildings located in urban environments, from several degradation phenomena related to the high pollution level. Undoubtedly, the formation of black crusts plays a crucial role in the decay of the stone materials belonging to the church. To better understand the composition and the formation dynamics of this degradation product and to identify the pollutant sources and evaluate their impact on the stone material, an analytical study was carried out on the black crust samples collected from different areas of the building. For a complete characterization of the black crusts, several techniques were used, including LA-ICP/MS, FT-IR, micro FT-IR, SEM-EDS. This battery of tests provided information about the nature and distribution of the mineralogical phases and the elements within the crusts and the crust-substrate interface, contributing to the identification of the major pollution sources responsible for the deterioration of the monument over time. In addition, the results revealed a relation among the height of sampling, the surface exposure and the concentration of heavy metals. Finally, information has been provided about the origin of the concentration gradients of some metals.