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CHARACTERIZATION OF COMPOUNDS FORMED AND ADDED ON SURFACE OF OUTDOOR SEVILLE CITY HALL

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The building of the City Hall of Seville constitutes one of the samples more important of the architecture plateresque in Andalusia. For centuries the stone façade has suffered different stages of restoration. These treatments joined the effects of the environmental pollution are responsible for formation and deposition of different chemical compounds on the surface of the monuments. This study will supply information of the environmental effects on the rock, and the treatments that have been performed in previous interventions.
The petrographic study showed the presence of a carbonate rock of thin grain constituted essentially by bioclastos and fine sand. The study by scanning electron microscopy showed a compact and continuous cover that suggested a polymer layer. The infrared spectroscopy study confirmed presence of acrylic resin. This resin covered sometimes a black crust constituted by alkanes characterized by mass spectrometry. In addition was found nodules constitutes by C, Ca, Fe, Si and Ca. These compounds appeared with gypsum and were attributed to environment contamination produced by combustion. Materials were observed that cover volumetric lagoons for losses of pieces or were used to fix fragments of stones that were free or displaced. The study by X-ray diffraction and infrared spectroscopy confirmed the presence of gypsum. Mortars constituted by calcite (60%) and inert material (40%; mainly quartz, feldspar and mica) were also characterized. In flute of the stone was found a black crust under which appeared a yellowish layer. The portable X-ray fluorescence and X-ray diffraction confirmed the presence of gypsum produced by environmental contamination. Gypsum was also found in the interior of the stone confirming that this mineral has emigrated due the high porosity of the stone.
In some zones of the façade was detected some possible wall paintings. Cross-sections were prepared and studied by optical and scanning electron microscopes. A layer of yellowish color appeared constituted mainly by Ca ($CaCO_3$) that was cover by other layer of grey colour performed by S and Ca (gypsum). A red layer performed with iron oxides was also found between the two layers. Sodium chloride was also found in some cross-sections.
These data showed that the wall was covered by a acrylic resin. Black crust produced by environmental contamination and formed before and after the last restoration has been found. Gypsum and mortars has been added to cover volumetric lagoons for losses of pieces or were used to fix fragments of stones. A layer of lime on the surface attributed to a wall painting was also detected. This information has been used for the restoration of the plateresque façade of the Seville City Hall.