

# Ceramic glazes from Gaudí's Modernism Architecture: Non-destructive study of tiles from Casa Vicens

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Antoni Gaudí was an architect from Catalonia, Spain, who belonged to the Modernist (Art Nouveau) movement and was famous for his unique style and highly individualistic designs. Gaudí is the author of many of the most famous and representative buildings of Barcelona architectural landscape, such as the Sagrada Família basilique, the Park Güell, Güell Palace, Casa Milà and Casa Batlló.

Gaudí obtained the title of architect in 1878 and one year later Gaudí's name first appeared on the books of the Pujol&Bausis ceramic factory which mention a shade of special yellow color called "Gaudí". All of Gaudí's works display a notable wealth of ceramic decoration, well represented in one of its first work: Casa Vicens, built between 1883 and 1888. Casa Vicens suffered several architectural modifications around 1925 and also some restoration ending the 1990's. In each of these modifications some of the tiles were replaced with new identical colour but different manufacturing process.

The aim of the present work is focused on identifying the composition of the body ceramic pieces and the characterization the glazes, approaching to their production techniques and the process they were decorated. The complete characterization of the materials used in Cultural Heritage monuments is a crucial step, enabling to make decisions about restoration and preventive conservation methods. We mainly used non-invasive instrumentation, such as "in-situ" and laboratory Energy dispersive X-ray fluorescence, X-ray diffraction, SEM/EDX and optical microscopy.

X-ray diffraction of the ceramic bodies reveals an increasing content of feldspar in the newest tiles with a lowering in gehlenite content. Mineral assemblages suggest an improvement of firing conditions along time. Design of glazes consists in leaves and flowers drawings, then white, green and yellow-orange colours are predominant. Optical and SEM microscopic observations allow concluding the presence of a two layers glaze structure: a) base white enamel and b) an upper colored layer. The total thickness of layers is 100 to 500 microns. Original glazes from Casa Vicens (dated 1880's) and those from 1920's restoration are based on lead and tin enamel (white). Green colour is obtained by the presence of zinc, cobalt and chromium in different proportions and yellow is based on antimony addition. Tiles from 1990's are based on white zirconium-titanium enamel, chromium cobalt green glaze and the yellow colour is produced by the presence of Pb-yellow and minor antimony content.