

Decorated ceramic tiles used in Catalan Modernist Architecture (c.1870 to c.1925): Composition, decay and conservation



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HIGHLIGHTS

- Decorated ceramic tiles used in Catalan Modernist Architecture.
- Ceramic tiles: composition, decay and conservation.
- Ceramic tiles used by architects such as Antoni Gaudí, Lluís Domènech i Montaner and Josep Puig-Cadafalch among others.

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ABSTRACT

Ceramic tiles used in many Catalan Modernist buildings (c.1870 to c.1925) by architects such as Antoni Gaudí, Lluís Domènech i Montaner and Josep Puig i Cadafalch among others are studied scientifically. More than 40 samples, specially selected from all the different types of ceramic tiles used, were studied in detail. XRD and SEM–EDS analyses were carried out to characterize the mineral composition and textural morphology of the paste, interface and glaze of the samples studied. These data will be used as a base for understanding better the decay and behaviour of tiles found in modernist buildings. As most Catalan Modernist buildings are now under restoration, the conservation and replacement of pieces has become an important subject of debate; thus the decay processes are analysed and the restoration protocols exposed.

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1. Introduction

Most of the Modernist buildings in Catalonia (c.1870 to c.1925), some of them declared world heritage sites by UNESCO, are decorated colourfully with ceramic tiles of many different shapes and sizes. This is the case of buildings such as Casa Amatller (1898–1900; Passeig de Gràcia, 41, Barcelona), the Hospital de la Santa Creu i Sant Pau (1902–1930; Sant Antoni M. Claret, 167, Barcelona), Park Güell (1900–1914; Olot, 5, Barcelona), Palau Güell (1885–1889; Nou de la Rambla, 3–5, Barcelona), Casa Navàs (1901–1907; Plaça del Mercadal, 5, Reus), the Institut Pere Mata (1898–1922; Passeig Briansó, s/n, Reus) and Casa Barbey (1910; Passeig, 5 – Figueras, 48, Illa Raspall, La Garriga), among many others [1–4].

Most of the architectural ceramics of these buildings, designed by important architects such as Gaudí, Domènech i Montaner, Gallsissà and Puig i Cadafalch and artists like Lluís Bru and Adrià

Gual, were manufactured in the Pujol i Bausis factory popularly known as “La Rajoleta” [5–7], located at Passatge Puig d'Ossa, s/n, Esplugues de Llobregat (Catalonia, Spain) (Fig. 1) and founded in the mid-18th century. Today the building is a museum.

It was from c.1870 to c.1925 when architecture and decorative arts acquired great importance, as seen in the chair rails, vents and scales of modernist buildings. The factory was also important in the field of research, including recovery and production of luster pottery.

The present paper reports a detailed scientific study of a wide range of ceramic tiles, which were selected as representative of the various lines of “La Rajoleta” throughout its operational period. The study focuses on identifying the composition of the ceramic pieces, determining as far as possible their production techniques, examining the way they were decorated and decay phenomena and putting forward conservation treatments. The characterization of the materials used is one of the most important steps, as this enables us to make decisions about restoration and conservation treatments. In addition, knowledge of the original materials makes it easier to reproduce them accurately.

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Fig. 1. Location of the “Rajoleta” factory.

2. Experimental

2.1. Sampling

More than 40 samples were selected, in order to cover all types of ceramics manufactured in the factory from c.1870 to c.1925. This selection was coordinated by the curators of the present museum and collection. The samples were organized into six groups (Fig. 2):

- *Unglazed tiles (Group I)*: this is not a very homogeneous group. Tiles have visual differences. All the samples date from c.1870 to c.1875.
- *Green lead tile (Group II)*: samples dated from c.1870 to c.1875.
- *Tiles with white glaze (Group III)*: these are ceramics with a white opaque glaze and no colour decoration. They are dated from c.1870 to c.1925.
- *Tiles with blue decoration (Group IV)*: all samples are coated with a white opaque glaze with blue decoration. All of them date from c.1870 to c.1925.

- *Tiles with polychrome decoration (Group V)*: in these samples the glaze is opaque (white), with a polychrome decoration. They were made from c.1890 to c.1925.
- *Tiles with metallic luster decoration (Group VI)*: these samples have luster decoration. They are dated from c.1890 to c.1925.
- For all samples, we studied the paste and the glaze, with special attention paid to the interface between them.

To study decay phenomena, three samples from each group, which had been exposed to environmental conditions, were selected from Modernist buildings.

2.2. Analytical methods

2.2.1. X-ray powder diffraction patterns

X-ray powder diffraction patterns were recorded on a PANalytical X'Pert PRO MPD Alpha1 powder diffractometer in Bragg–Brentano $\theta/2\theta$ geometry of 240 millimetres of radius, using a nickel filtered Cu $K\alpha$ radiation ($\lambda = 1.5418 \text{ \AA}$). Work power

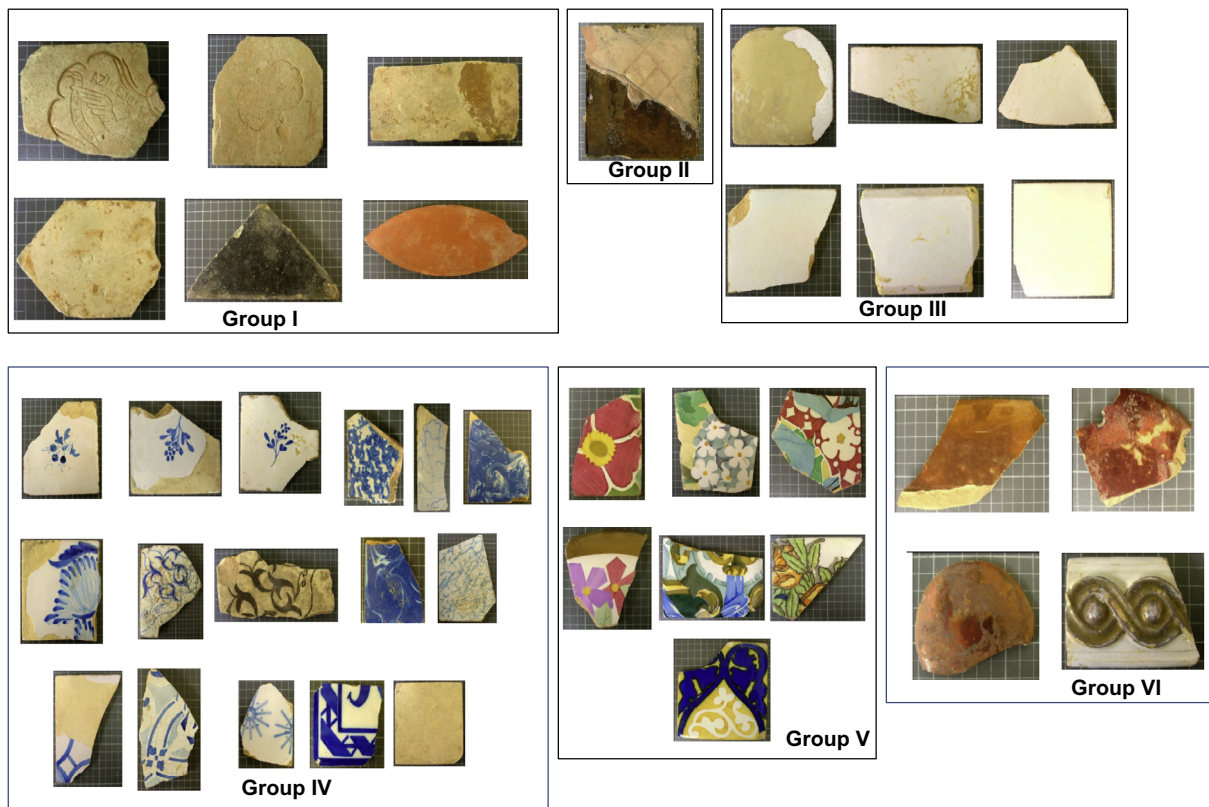


Fig. 2. Photographs of the samples studied, divided into groups: unglazed floor tiles (Group I), green lead tile (Group II), tiles with white glaze (Group III), tiles with motifs in blue (Group IV), tiles with polychrome decoration (Group V), tile decorations with metallic luster (Group VI); (1 square = 1 cm). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

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