

## Mock-up Samples

Most of the samples in the database are synthetic samples manufactured in the last few years for which we know their composition. Within this section there are different types of samples according to their manufacture process:

### Ferrogalica

These synthetic samples contain different inks (iron gall, sepia, lamp black and mixtures of iron gall with sepia and lamp black) bound with Arabic gum and elaborated according to traditional recipes from the 13th to 17th centuries.

The substrates are Somerset paper with different treatments (gelatin, wheat starch or gum Arabic), watercolour paper and modern parchment.

### Synthetic

These samples were elaborated by students of the Conservation and Restoration degree at the University of Granada, imitating different traditional artistic techniques.

### Lab samples

Lab samples is a set containing handwritten samples of 42 inks manufactured in 2023 following ancient recipes, from pure inks (sepia, iron gall, bone black...) to mixtures of them in different proportions on five different substrates: cotton, linen, cotton-linen, hemp, and parchment. The last five samples correspond to captures of the substrates illuminated with ultraviolet light to observe the presence or absence of fluorescence.

### Mock up samples of pigments

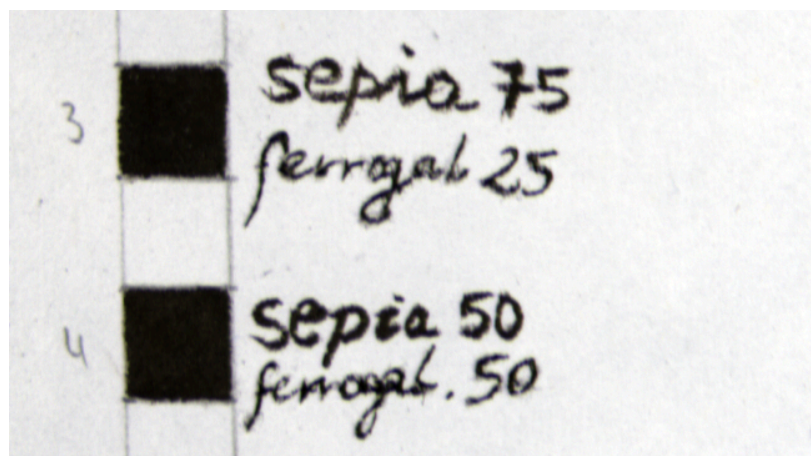
This set contains 90 samples of different pigments, dyes and mixtures applied on parchment and cotton-linen paper (180 samples in total), and bound with Arabic gum and egg white.

### Pencils Hard

These samples were made using Faber-Castell brand graphite pencils of 14 different degrees of hardness: 6H, 4H, 2H, H, F, HB, B, 2B, 3B, 4B, 5B, 6B, 7B and 8B on four substrates: cotton-linen, cotton, hemp, and linen.

### Aged

Ink samples aged for three different time periods: 27, 144 or 288 hours with two different methods: stored in an ageing chamber or subjected to hydrochloric acid vapours. There are three inks, a mixture of iron gall and carbon black, pure iron gall and iron gall with copper sulphate.



## Selva Notebook

This is a manuscript book of finances, receipts or commercial documents written between 1682 and 1683 from the town of Selva, in the Balearic Islands (Spain).

Multiple inks have been detected in the document after analysis with different methods, which can be summarised in two groups:

- Iron gall inks with different proportions of sulphate, which are transparent in the infrared range.
- Mixed inks visible in the infrared. It has been found by X-ray fluorescence that they have a similar composition to iron gall inks, so they are probably a mixture of these with carbon or bone inks.

Corrosion of the inks has caused bleed-through and transfer of inks between pages in contact. As for the supports, two can be distinguished: the book cover is made of parchment and the inside is rag paper.



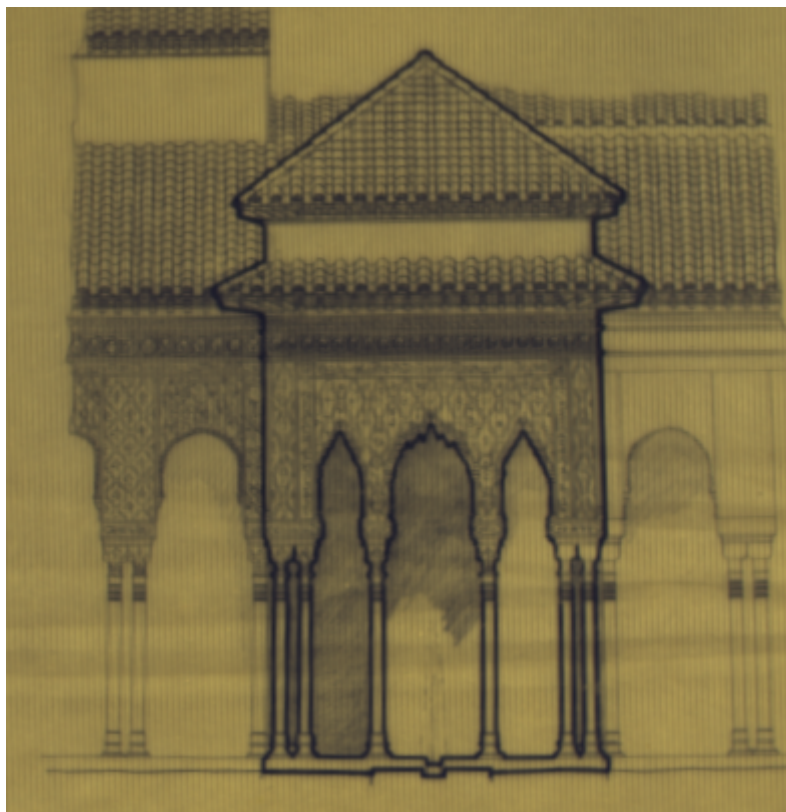
## Alhambra Plans

Plans of the Alhambra of Granada made by different architects between 1923 and 1936 for restoration works of the monument.

As for the drawing materials, most of the plans are painted with unidentified inks and pencil, and one of them contains red and black crayons.

In all the cases, the substrates are translucent cellulosic supports that have obtained their transparency through different techniques, identified by X-ray fluorescence spectrometry:

- Translucent paper obtained by the addition of greasy substances, identified by a high presence of sulphur.
- Like in the previous case, the high presence of sulphur indicates the addition of greasy substances, but the presence of silicon is also found.
- Sulfurized papers, resulting from sulfuric acid baths and application of aluminium sulphate.
- Sulfurized or semi-sulfurized papers, it has not been identified which one of the two is the treatment used.
- Papers that have obtained their transparency by fine grinding of the paper pulp.
- Unidentified technique, probably a mixed technique with acid baths and addition of a layer of greasy substances as a false varnish.





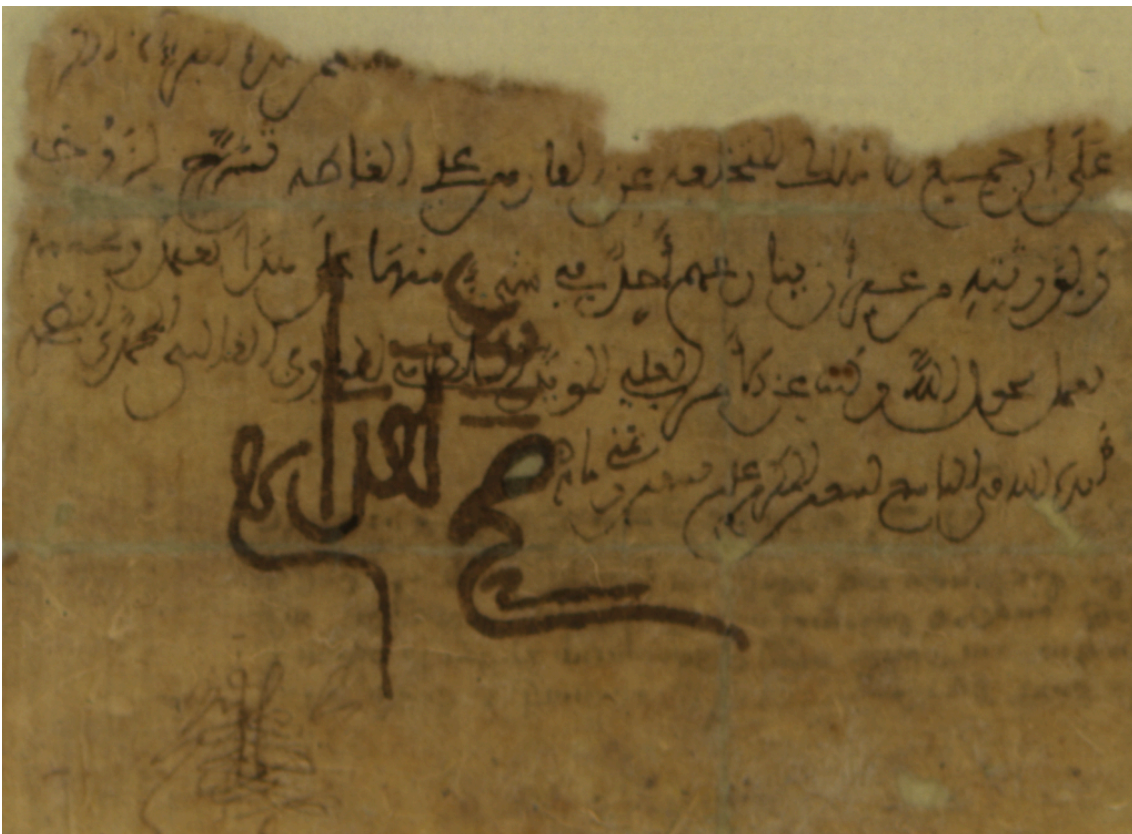
## Nasrid Alamas

This set is a collection of documents that have in common the presence of alamas, which are short phrases in official documents that were drawn as signatures by the sultans. The set contains two original documents and one falsified, originating between 1454 and 1492.

In every one of the cases different black inks were used for their writing, probably mixed in all cases, formed by a metalloacid ink and an organic ink in greater proportion.

As for the substrates, we can differentiate between parchment and Arabic paper.

These three documents have been restored, the first one in 2004, by disinfection and mechanical cleaning, and the other two in 2021, with cleaning and elimination of deformations.



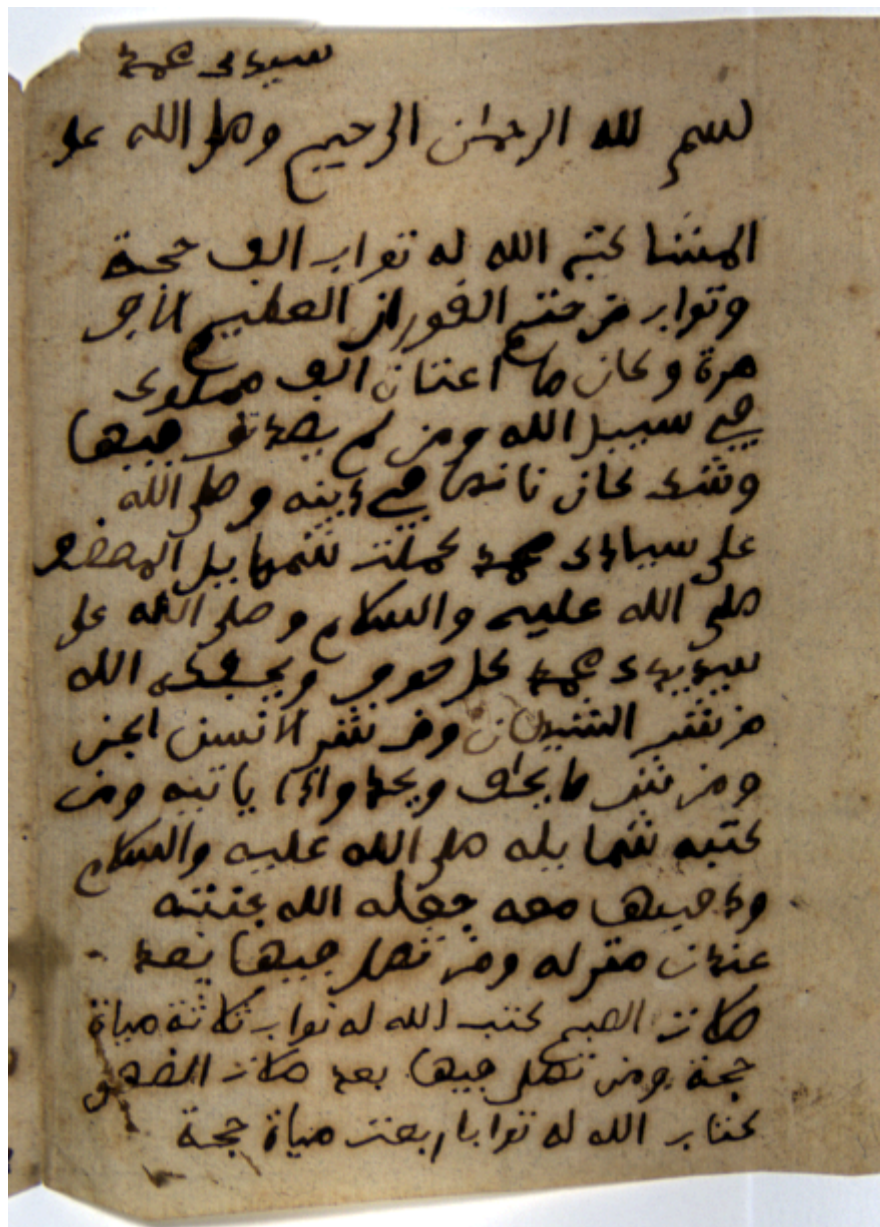


## Provincial Archive Manuscripts

This set consists of five different documents preserved in the collection of Arabic documents in the Granada Provincial Historical Archive. Four of them are notarial documents from between 1488 and 1494, and the fifth one is a religious text of which no date is known.

Different types of inks have been detected in these documents: Mixed inks with unidentified components, mixed iron gall and earth inks, mixed carbon and earth inks, mixed inks with presence of earth, pure carbon and pure iron gall.

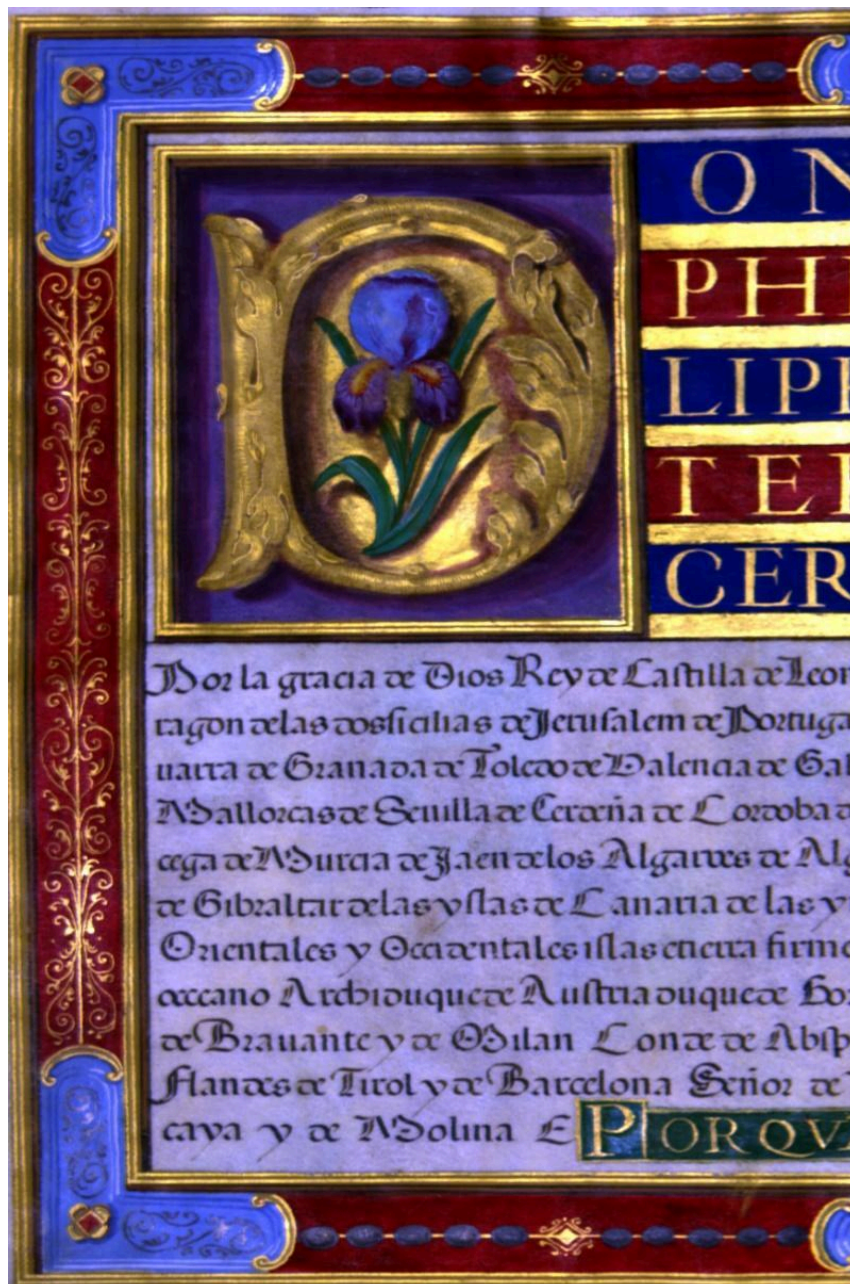
As for the substrate, in all of them it has been identified as linen paper by optical microscopy, scanning electron microscopy (SEM) and infrared spectroscopy (FTIR).



## Royal Chancery Archive

Collection of documents from the Archive of the Royal Chancery of Granada. It consists of 7 documents with parchment substrate containing lawsuits of nobility between 1459 and 1608, and 4 maps on linen and cotton paper from the 18th century.

Different pigments and dyes have been used in these documents. By using different techniques, it has been possible to identify the presence of cinnabar, azurite, lead white, minium, malachite, verdigris, lead-tin yellow, orpiment, gamboge, carmine and cobalt blue smalt. The presence of organic pigments has also been detected but they have not been identified. As for the inks used in the texts, most of them are identified as iron gall with different sulphates: Zn and Cu.





# Genealogies Book

This is a collection of documents from the 16th and 17th centuries preserved in the Archive of the Royal Chancery of Granada. It is a series of family trees, most of them handwritten, but with some printed fragments.

Every one of the documents have a rag paper support and in previous analysis it has been possible to identify the presence of two inks, one of them being carbon black and the other a mixture of sepia and iron gall inks, which fades in the SWIR range.

The documents were restored in 2005 by mechanical cleaning with non-greasy soft rubbers, washing in water and drying under weight and between blotters.

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Don Sancho dauila La 2.ª Marques de Belada 9.ª de San Roman.	Don Gomez dauila 1.º Marques de Belada. 8.ª de San Roman. La Marquesa Juana Teresa Carrto Mendoca de Albornoz.
La Marquesa Jo na Juana de Toledo Henrru que?	Don Diego Henriquez de Guzman 3. Conde de Alua de Alate La Condesa Juana Leonor de Toledo y Guzman.
Don Garcia de To ledo Otorio 3. Mar ques de Ullafran ca Duque de Forman dina	D. P. de Toledo. 2. Mar ques de Ulla Franca 4.ª rey de Napoles. La Marquesa Juana Ma ria Otorio Pimentel 3.ª del Estado de Ulla Franca
La Marquesa Jo na Victoria fo lonaz Aragon	Arcanio Colona Gupe de Paliano La Duquesa Juana Lu ana de Aragon i Car bona.
	Sancho dauila 7.º de San Roman i Ulla nueva de Gomez Juana Catalina dauila 1.ª de Belada y Enigo Lopez de Mendoca i Albornoz Virrey de Sicilia Doni Giomar de Vico Manual D. Enrique Enriquez Capitan J. en Aragon D. Teresa Enriquez de Burg. Don fabrique de Tole do 2. Duque de Alua. La Duquesa D. Isabel de Zuñiga Pimentel. Don fabrique de Tole do 2. Duque de Alba. La Duquesa Juana Isabel de Zuñiga Pimentel. D. Luis Pimentel. 1. Mar ques de Ulla Franca. La Marquesa Juana Juana Otorio Arcanio Colona Gran Chan celler de Napoles i General de la Ulla Franca. Mar de Monte feltris i Otorca. Don fernando de Aragon 2. Duque de Montalbo. La Duquesa D. Catalina de Cardana o Requesens.