

Conservation of Archaeological Limestone False Doors Applied on a Door No. 1755 at Atfiyah Museum Store – Egypt

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To cite this article:

Rabea Radi Abdel Kader, Shaimaa Sayed Mohamed El-Sayed. Conservation of Archaeological Limestone False Doors Applied on a Door No. 1755 at Atfiyah Museum Store – Egypt. *Arabic Language, Literature & Culture*. Vol. 4, No. 1, 2019, pp. 16-20.

doi: 10.11648/j.allc.20190401.12

Received: February 13, 2019; Accepted: March 19, 2019; Published: May 15, 2019

Abstract: Stone false doors are considered one of history writing resources, within them, a lot of topics belonged to ancient Egyptian religious rites can be described, some of them contains inscriptions depict sacrifice forms of Egyptian gods and goddess, and with the false door, dead's soul can enter and go out between the world of living and the dead, there are a lot of limestone objects stored at Atfiyah museum store – Ministry of Antiquities – Egypt which known for the archaeologists as (Ali El-Kholy museum store), these objects exposed to many deterioration factors that threaten them especially the false doors. The research aims to shed the light on one of limestone false doors (no. 1755), samples were taken to identify the components and deterioration phenomenon, examined and analyzed to set a tight plan of conservation processes, first, mechanical and chemical cleaning were done to remove dust and clay deposits, then the weak surface were consolidated to save the important inscriptions.

Keywords: Conservation, Archaeological Limestone False Doors, Atfiyah Museum Store, Cleaning, Inscriptions, Cultural Heritage

1. Introduction

The selected limestone false door is one of a group of stone objects stored at Atfiyah museum store and returns to old kingdom era in the Egyptian history, Abdel Hamid Zayed is the excavator of these stone objects in the 1960s at El - Shawaf archaeological site – Giza, from this period till now, the group is stored at its current place [1-5].

The selected false door was made of limestone, it's a chemical sedimentary rock with hardness (3) according to Moh's scale of hardness, it deposited in lakes, seas and other marine areas, the most important thing which is distinctive of sedimentary rocks is bedding layers [6-15].

False doors are architectural units with religious purposes, they were used at tombs and funerary temples in the most of ancient Egyptian ages, the main purpose was to permit the soul of dead to go in and go out of his tomb from the Ancient era through the ancient Egypt history [16]. Archaeological

documentation of the case study:

1. Number of the false door at Atfiyah archaeological records: 1755.
2. Storing place: Atfiyah museum store – Ministry of Antiquities – Egypt.
3. Excavator: Abdel Hamid Zayed – Senior of Archaeologists at middle Egypt in the 1960s.
4. Excavation site: El-Shawaf archaeological site – Giza
5. Archaeological description of the door: Apart of Hieroglyphic inscriptions of a false door with irregular dimensions, at the upper side of the inscriptions, there are remains of view for a man or a woman sitting on a seat, the man probably called " mry Issi".

The selected false door dimensions: 32 cm × 39.5 cm.

Photographic Documentation

The selected false door is photographically documented before and after conservation processes, the deterioration phenomena diagnosed as follows:

1. Dust and clay deposits.
2. Limestone weakness.
3. Writing a number with black ink- (Figure 1).

2. Methodology

A sample of limestone (from invisible area) was taken to identify the components, and deterioration phenomena using examination and analysis methods as follows:

2.1. Scanning Electron Microscope (SEM)

The stone sample was examined using SEM with magnification power (1000×), to identify surface's internal texture and evaluate decay stage of minerals crystals-(Figure 2).

2.2. Elementary Analysis Using EDAX

EDAX refers to Energy Dispersive X-ray Analysis, it's an elementary analysis unit attached to SEM, stone sample was analyzed to identify mineral elements and their porpotion. (Figure 3)- (Table 1).

2.3. Polarizing Microscope Examination

Thin section of the stone sample was made to examin it under polarizing microscope in the existence of both polarizer and analyzer, and the absence of analyzer, from the crystals shape and their optical properties, mineral components can be identified, also deterioration phenomena. (Figures 4-5)



Figure 1. Selected False door no. 1755 at Atfiyah museum store.

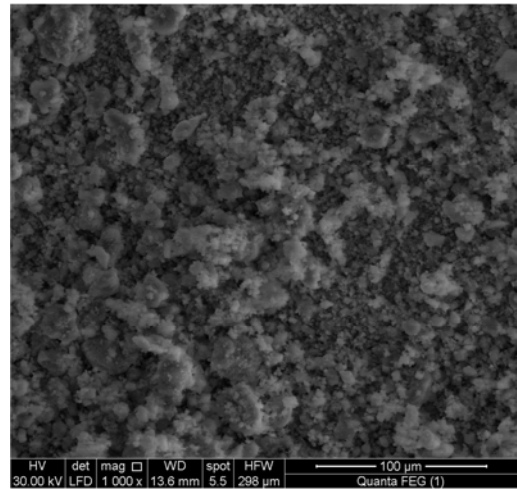


Figure 2. Stone sample examination by (Scanning Electron Microscope) (1000x mag).

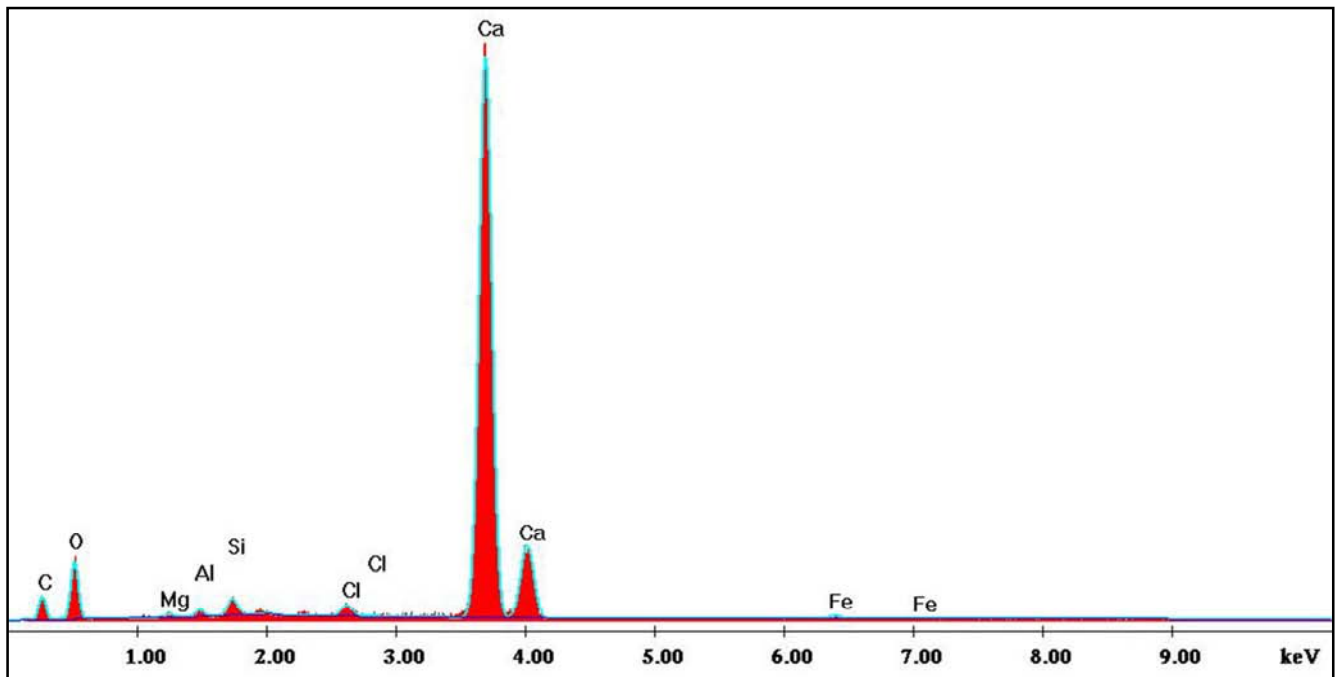
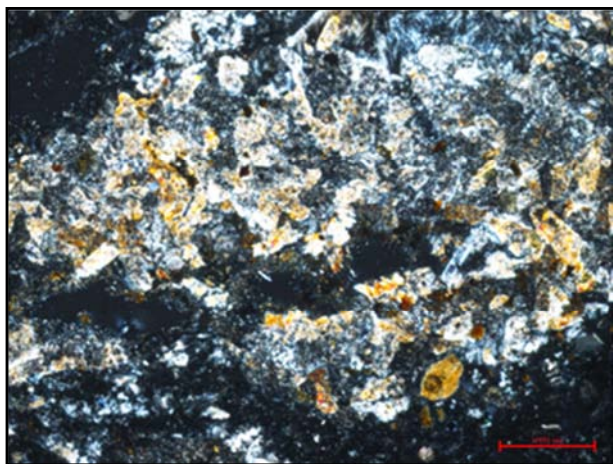
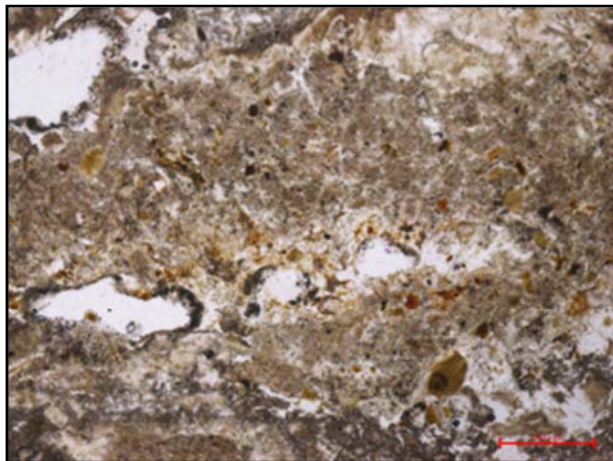


Figure 3. Elementary analysis of stone sample by EDAX.

Table 1. Shows mineral elements and their proportion of stone sample.

Elements	Wt %	At %	K-Ratio	Z	A	F
C K	9.76	18.18	0.0331	1.0417	0.3255	1.0012
O K	36.67	51.27	0.0390	1.0270	0.1034	1.0001
Mg K	0.51	0.47	0.0016	0.9899	0.3203	1.0033
Al K	0.65	0.54	0.0028	0.9618	0.4476	1.0064
Si K	1.46	1.16	0.0085	0.9908	0.5829	1.0111
Cl K	0.82	0.52	0.0072	0.9431	0.8851	1.0609
Ca K	49.36	27.55	0.4762	0.9645	0.9996	1.0005
Fe K	0.77	0.31	0.0063	0.8906	0.9205	1.000
Total	100.00	100.00				

**Figure 4.** Examination of stone sample using polarizing microscope (the existence of both polarizer and analyzer).**Figure 5.** Examination of stone sample using polarizing microscope (the absence analyzer).

2.4. The Conservation Processes of the Selected False Door No. 1755

2.4.1. Cleaning Processes

First, dust and clay deposits were cleaned mechanically by brushes, scalpels and wooden toothpicks, then, the remains of them were cleaned chemically by a solution of acetone and distilled water 1:1, afterthat, the surface was washed using distilled water only to remove the previous solution remains. (Figure 6), there was a difficulty to remove the recording number which was written with black ink.

2.4.2. Consolidation Processes

The selected object was consolidated by Wacker (OH) 100 diluted with ethyl alcohol in percentage 3% in five consolidation cycles (with the wait of dryness of every consolidation cycle before the application of which followed), the false door was left for 24 hours between consolidation cycles, the consolidation method was by brushing, the purpose of consolidation processes to improve the weak surface and save false door valuable inscriptions. (Figures 7-9).

**Figure 6.** Limestone false door no. 1755 during cleaning processes.**Figure 7.** Selected false door after consolidation cycles.



Figure 8. False door no. 1755 before conservation processes.



Figure 9. False door no. 1755 after conservation processes.

3. Results and Discussion

From examination and analysis of the stone sample taken from the selected false door, EDAX results are: the basic component of limestone is calcite (calcium carbonates) because of high percentages of Ca and C, also, there are clay minerals because of the existence of Al, Mg, Si as elements, and also, there are quartz and some ferrous minerals (the existence of Si, Fe). Clay minerals, quartz and ferrous minerals are traces in the sample, there is probably an effect of burial soil because of Cl existence in the sample.

SEM examination shows that the surface is weak and needed to be consolidated, it is obvious from the magnification of internal texture (1000 ×).

Polarizing microscope examination confirms the elementary analysis results (EDAX), there are many crystals of calcite, also crystals of clay minerals, quartz and ferrous minerals as traces (in the existence of both polarizer and analyzer and the absence of analyzer).

4. Conclusion

The false doors were used in Ancient Egypt at tombs for funeral purposes to serve the dead in his eternal life, at Atfiyah museum store – ministry of Antiquities – Egypt,

there are many stone panels and false doors that were excavated in the 1960s at El-Shawaf excavation site – Giza, they were stored from this period till now at their current place without any conservation processes and their valuable views became weak, the false door no. 1755 were selected to become as a case study because the surface was weak and needed to be cleaned and consolidated.

First, a sample was taken, then examined and analyzed to identify components and deterioration phenomena, after that, the conservation processes were done to save this door and its precious views.

The researchers recommend to store the door no. 1755 in an ideal storing environment (Air temperature 18-22°C and relative humidity 45-55% away from dust, air pollution gases, microorganisms and insects) also, not to write any recording numbers using inks on the monuments.

Acknowledgements

To Mr / Ahmed Khalil Rashid – Manager of Atfiyah museum store – Ministry of Antiquities – Egypt for his great efforts exerted with us.

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