

# Stratigraphy of metals in heritage pollution crusts

by LIBS

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Atmospheric pollution interacts with stone materials and generates various decay typologies. The formation of black crusts is one of the most harmful phenomena for architectural heritage. These are formed mainly by gypsum, carbonaceous substances, elemental carbon, and heavy metals. Previous studies have revealed the necessity to deepen our knowledge on the in-depth distribution of metals in order to better understand the crust formation processes. In our study the LIBS technique [1] was used to shed light on the processes and mechanisms involved in the formation of such degradation processes. For this purpose, mock-up marble samples covered with known amounts of pollutants (heavy metals and elemental carbon) were subjected to accelerated ageing in climatic chambers. Additionally, real samples of black crusts taken from monuments of the Monumental Cemetery of Milan (Italy) were analyzed. These samples were characterized in previous studies with different analytical techniques [2-3]. The analyses carried out on the mock-up marble samples showed that the heavy metals tend to migrate towards the inner layer of the substrate. In real black crusts, instead, different trends on the in-depth distribution of heavy metals have been observed and could be attributed to different periods of accumulation or exposure to pollutants.

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## References

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