

## Editorial

# Unexpected and Worrying Pollutants Accumulation: Built Heritage

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In the last years, the interest of preserving the built heritage is gathering strength in order to maintain our society symbols in the correct conditions. For this reason, studies of the deterioration of building materials are common to discover and clarify the suffered decay processes. In this way, the atmosphere and more specifically, the atmospheric pollution has been pointed as one of the most important external stressors for the building materials, being the atmospheric acid gases the most dangerous ones which can seriously affect not only building façades but also structural integrity [1-4]. Thus, the buildings located in polluted atmospheres, as the urban and industrial areas, are the most affected.

Conversely, although being more aware of the need to protect our history, we have forgotten that these building are more than a history piece, because they have shared our atmosphere all the time. In fact, they have been passive spectators of our atmospheric problems. Moreover, in the polluted atmosphere, together with the mentioned gases, are also present a lot of dangerous compounds which could have been accumulated on the surface of the materials [5,6]. Thus, although these pollutants not be very worrying for the buildings integrity, the manipulation of the materials or, even their interaction with the environment, could be dangerous, at least, for the human security. Despite all, the control of the content of these pollutants in building materials is not very commonly found in the literature.

Taking all of these into account, IBe A research group, from the Department of Analytical Chemistry of the University of the Basque Country, started a few years ago in the environmental risk assessment of the urban-industrial buildings as complement of conservation state studies. Metals, salts or COV have been some of the measured pollutants in different buildings, both cultural heritage and urban-industrial buildings, from early twenty century [7-10]. These studies have revealed the pollution suffered by the urban buildings that has been accumulating over the years even the source has been eliminated, as passive pollutant repositories [11,12].

Lead, copper, barium, PHAs, sulphates or nitrates have been found in very worrying concentration. However, lead is the most perturbing case because it was present in a higher concentration than in the road soils measured by our research group, which evidences

the high accumulation capacity of building materials [11,13]. Other evidence obtained from these risk assessment studies was the high correlation between the black crusts and the pollutant accumulation which allows the black crust to act as decaying reaction cores. Nevertheless, the black crust free materials can also accumulate pollutants.

In any way, the discovery of the buildings role like hazardous pollutants repositories, as well as, the confirmation of the high penetration capacity of the pollutants into materials evidences that the risk assessment of the buildings is crucial for the correct manipulation of them during restoration or demolition works, when the pollutant could be released and affect the human security. Even, the study of the interaction of these buildings with the environment could be important in case of lixiviation of the pollutants. However, due to this novelty approach, there is not any legislation about it and therefore, control. Thus, when restoration or demolition works are carried out and the pollutants can be released, there is not any stabilized protocol, not even for control the level of the pollutants. The regulated pollutants in buildings are asbestos, lead water pipes and paints or these kinds of old materials. However, there is not any awareness about the absorbed lead in the material surfaces unless it has been an industrial factory.

For all of these, the future researches will be focused in the study of the real bioavailability and in the toxicological studies of the absorbed pollutants, at least, during the materials manipulation (cleaning, demolition, etc.). These results could create an awareness of the problem and promote the creation of the required legislation around it.

On the whole, we have been able to be aware of the importance of safeguard the built heritage, but we must not forget that they not only have endured our history and thus, safeguard also the environmental and human security.

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