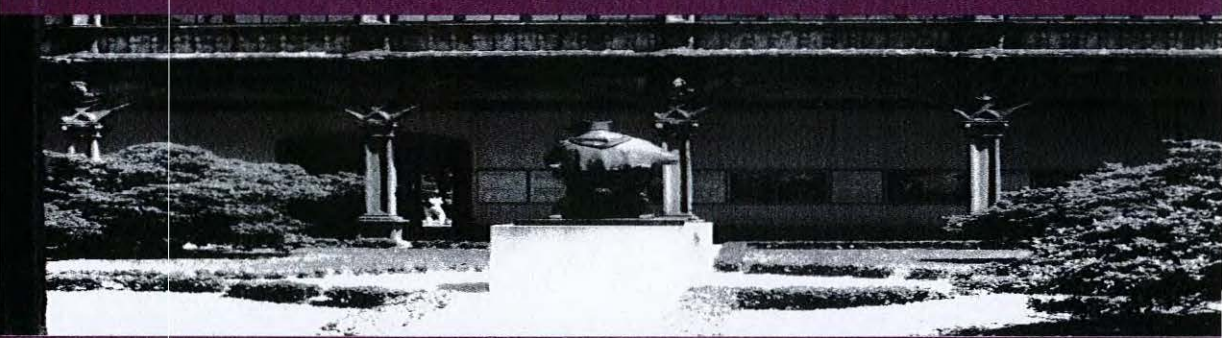
CURSOS E CONGRESOS

Research Advances for the Conservation of Cultural Heritage

International Congress on Science and Technology for the Conservation of Cultural Heritage

Santiago de Compostela, Spain, 2-5 October 2012

Book of Abstracts



Edited by
Massimo Lazzari
Sophie Rochette

UNIVERSIDADE DE SANTIAGO DE COMPOSTELA
publicacións

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International Congress on Science and Technology for the Conservation of Cultural Heritage (2012. Santiago de Compostela)

Research advances for the conservation of cultural heritage : International Congress on Science and Technology for the Conservation of Cultural Heritage, Santiago de Compostela, Spain, 2-5 October 2012 : Book of Abstracts / edited by Massimo Lazzari, Sophie Rochette. — Santiago de Compostela : Universidade de Santiago de Compostela, Servizo de Publicacións e Intercambio Científico, 2012
163, VII p. ; 27 cm. — (Cursos e congresos da Universidade de Santiago de Compostela ; 218)
Na anteport.: Science and Technology for the Conservation of Cultural Heritage
Conferencia organizada en nome da Spanish Network of Science and
Technology for the Conservation of Cultural Heritage (TechnoHeritage) por a
Universidade de Santiago de Compostela
D.L. C 1781-2012. – ISBN: 978-84-9887-930-8
1. Bens culturais — Protección — Congresos I. Lazzari, Massimo, ed. lit. II. Rochette, Sophie, ed. lit. III.TechnoHeritage IV. Universidade de Santiago de Cornpostela V. Universidade de Santiago de Compostela. Servizo de Publicacións e Intercambio Científico, ed.

7.025:061.3(461.11 Santiago de Compostela)"2012"
061.3(461.11 Santiago de Compostela)"2010":7.025

Edita
Servizo de Publicacións e Intercambio Científico
Campus Vida
15782 Santiago de Compostela
usc.es/publicacions

Imprime
Imprenta Universitaria
Campus Vida
15782 Santiago de Compostela

Dep.Legal: C 1781/2012
ISBN 978-84-9887-930-8

Physical and aesthetic decay of built heritage from biological films developed on joint mortars

Elena M. Pérez-Monserrat,[1] Asunción de los Ríos,[2] Rafael Fort,[1]
Mª José Varas-Muriel,[1,3] Mónica Álvarez de Buergo[1]

[1]Instituto de Geociencias IGEO (CSIC-UCM), c/José Antonio Nováis, 2. 28040 Madrid, Spain
e-mail: empmon@geo.ucm.es, rafael.fort@csic.es, monica.alvarez@csic.es
[2]Museo Nacional de Ciencias Naturales (CSIC), c/José Gutiérrez Abascal, 2. 28006 Madrid, Spain, e-mail: arios@ccma.csic.es
[3]Departamento de Petrología y Geoquímica, Facultad de Ciencias Geológicas (UCM), c/ José Antonio Nováis, 2. 28040 Madrid, Spain
e-mail: mjvaras@geo.ucm.es

Porous stone materials can be affected by litobiontic communities' colonization responsible for physical-chemical processes that give rise to their biodeterioration, also contributing to the loss in aesthetic value of built heritage. Thus, in urban areas with high levels of atmospheric pollution, in the aesthetic decay that occurs in façades due to soiling by particulate matter deposition, the development of biological films that in many cases have an intense dark color must be taken into account.

This paper focuses on biodeterioration processes affecting the joint mortar used on the limestone façades of the Formerly Workers Hospital of Maudes (Madrid, Spain). This type of material is very susceptible to biodeterioration processes, because of its high porosity. The mortar is characterized by Polarization Optical Microscopy, X-ray Diffraction and Mercury Intrusion Porosimetry, and special attention to the interaction with colonizing microorganisms by means of SEM-BSE technique (Scanning Electron Microscopy with backscattered electrons *in situ*) is given. Besides, how the joint mortar biological colonization contributes to limestones façades soling is quantified, through the comparative analysis of the chromatic parameters of the limestone with respect to the mortar by means of Spectrophotometry.

The study reveals that lichen thalli are directly involved in the material disruption, leading to the decohesion of its components. They also contribute significantly to the degree of darkening that the building façades show. While the limestone soling is very heterogeneous and responds to its interaction with air pollutants, for the joint mortar it is much more homogeneous and, in areas of higher humidity and with no direct pollution exposure is due to a biofilm development. In all other areas where joint mortar show darkening, this is mainly due to its interaction with air pollutants.

This paper provides information on the effect of biological colonization in mortars, entailing the implementation of the SEM-BSE technique in such materials, widely used in built heritage.