Projekttitel:

New ecological and sustainable solution for protecting architectural metals using an ecologically friendly biological treatment

Projektleitung:

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Projektbeschrieb / Abstract:

The project aims to provide a new ecological and sustainable solution for protecting architectural metals using an ecologically friendly biological treatment. The method is based on the development of an aesthetical and protective biopatina that can be applied for preserving built heritage, in particular outdoor metal monuments and historical landmarks.
Outdoor metal surfaces encounter irreversible changes in their original appearance and structure due to electrochemical processes, chemical reactions with pollutants, and the physical phenomenon of deposit accumulation. The corrosion patina formed is considered aesthetically valuable and part of the life history of the monuments. Most often, the corrosion products present are, however, unstable and can be leached out. Constant efforts are therefore devoted to stabilize them and overcome their continuous damage through conservation-restoration interventions.
So far, the methods used for protecting metal surfaces create an artificial barrier against aggressive environments without considering the difference in terms of patina composition and stability. Most frequently, organic coatings are employed, such as microcrystalline waxes, acrylic resins and corrosion inhibitors (i.e. benzotriazole for copper alloys). However, these treatments are unsatisfactory in terms of efficiency and durability. In addition, inhibitors are toxic and pose potential threats to human health and to the environment.
Taking advantage of unique properties of metal-resistant microbes, existing unstable corrosion products could be converted into an insoluble and stable *biopatina* that provides the treated surfaces with long-term protection and no aesthetical alteration. The project aims to extend this process developed on copper (by LAMUN since 2006) to iron, zinc and aluminum alloys that are commonly found as architectural parts.
The application of the biopatina process on different types of alloys will result in the formation of a homogeneous patina providing the treated surfaces with a naturally aged appearance while inhibiting corrosion.