



1. Research activity

The PhD project investigates the properties and the efficiency of two innovative and eco-friendly materials for the conservation of bronze and silver historical objects. In particular, the research focuses on PVA-based cleaning gels and chitosan-based protective coatings, selected for their biocompatibility. The first ones are studied in order to optimize their ability to selectively remove from the corroded surfaces only unstable and disfiguring compounds, preserving the ones that are appreciated for their aesthetic appearance. The second ones are studied in order to develop green active coatings for the protection of metal artifacts exhibited in both indoor and outdoor environments. Validation tests are conducted on proper sacrificial reference disks, composed by copper and silver-based alloys and characterized by ancient-like microchemical and microstructural features. Their corrosion patinas reproduce the ones that naturally develop over time in two different contexts: the archaeological and the exhibition one. Concerning the archaeological environment, the reference patinas developed during a 15-years burial inside real Sardinian soils. Regarding the exhibition context, the formation of real-like patinas has been induced by submitting the bare disks to accelerated ageing treatments, reproducing highly polluted environments of both indoor and outdoor atmospheres.

The characterization of the corrosion patinas, as well as the evaluation of the conservation treatments efficiency are carried out through a multi-analytical approach, including OM, FE-SEM-EDS, ATR-FTIR, micro-Raman and XRD analyses.

2. Research products

Publications (non ISI journals):

2022 - G. M. Ingo, C. Riccucci, G. Pisani, M. Pascucci, D. D'Ercole, E. Guerriero, F. Boccaccini, G. Falso, G. Zambonini, V. Paolini, G. Di Carlo. The vehicle braking systems as main source of inhalable airborne magnetite particles in trafficked areas. *Environment International*, 158, 106991.

Abstracts:

2021 - F. Boccaccini, G.M. Ingo, C. Riccucci. An insight into the precious lustre decoration technology through chemical, mineralogical and statistical analyses. (Conference presentation abstract. BEGEOLOGIST a young network - I Congresso Nazionale dei Giovani Geoscientisti - Naples)

2021 - F. Boccaccini, C. Giuliani, C. Riccucci, M. Pascucci, G.M. Ingo, G. Di Carlo. How metal-polymers interactions can affect the aesthetic features of protective coatings for artistic objects: the case of chitosan-based films. (Conference presentation abstract. XXVII CONGRESSO NAZIONALE DELLA SOCIETÀ CHIMICA ITALIANA - La chimica guida lo sviluppo sostenibile - Online congress)