Nano-systems for the conservation of immoveable and moveable polymaterial Cultural Heritage in a changing environment

www.nanomatch-project.eu

ADRIANA BERNARDI

National Research Council (CNR)
Institute of Atmospheric Sciences and Climate (ISAC)
e-mail: a.bernardi@isac.cnr.it

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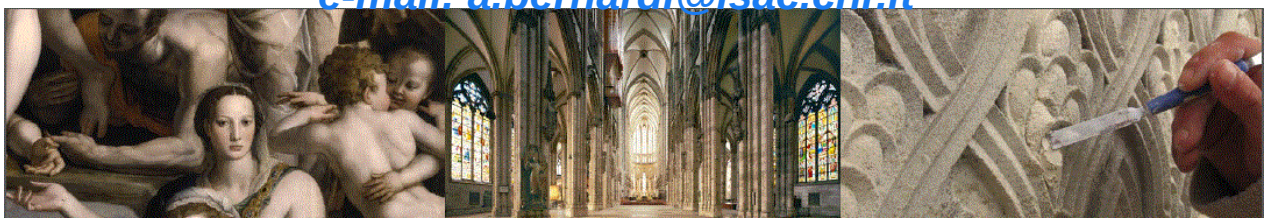

Project aim

Impact of natural deterioration agents and pollutants on both historic materials and applied preservation products

Failure of most organic conservation/restoration treatments and questionable efficiency of inorganic ones

Higher costs of future maintenance, conservation and refurbishment.

Urgent need to develop new or to improve actual products and conservation methodologies as alternatives to conventional ones for Cultural Heritage.

In NANOMATCH two alkoxide consolidant precursors have been developed and produced:

calcium alkoxides have a strengthening effect on stones and provide an alkaline supply on wood

aluminium alkoxide (A18) has a glass-in-glass- consolidant effect on micro-fractured glass

Main features of the new products:

- evolving to nano-structured adherent coatings
- compatible with calcareous stones (same chemical and mineralogical composition), able to bind to the substrates of wood and glass (high chemical affinity)
- no detrimental effect on polychromies
- ensuring enhanced sustainability, durability and efficiency compared to conventional conservation products
- low cost products, simple in the application, respect environment & human health

Project outcomes

Performance assessment in laboratory and after one year exposure in field to demonstrate:




Cologne Cathedral (DE); S. Croce Cathedral, Firenze (IT); Oviedo Cathedral (ES); Stavropoleos Monastery, Bucharest (RO)

Stone and wall painting:

- ✓ workability and easy applicability
- ✓ aesthetic, physical, chemical compatibility
- ✓ surface cohesive effect
- ✓ in-depth consolidation and penetration
- ✓ durability and long-term stability
- ✓ capability of re-adhering powdering pigments

Wood:

- ✓ acid neutralisation

Guidelines to answer practical questions of conservators, such as:

- ✓ Which materials can be treated?
- ✓ Which are the limitations?
- ✓ How should the product be applied?

Glass:

- ✓ transparency, equal refractive index and high initial adhesion
- ✓ infiltration and filling of micro-fissured glasses, glass-in-glass consolidation
- ✓ stable at low and medium levels of RH
- ✓ for very high RH levels further modified or protected by top coatings

Risk assessment:

- ✓ nanoparticles release from the products is negligible both in lab and in outdoor scenarios (artificial weathering)
- ✓ risk evaluation and MSDS
- ✓ production of application guidelines

Partnership & Future perspectives

Coordinator

Partners

Glass consolidant (A18) developed during a previous EU project (CONSTGLASS) and optimized in NANOMATCH project: almost already available on the market

Calcium alkoxide:

- ✓ the synthesis process is now under the patent procedure
- ✓ the product is still bi-component with a limited pot life
- ✓ only the "high end" of the market can be served, not yet the "bulk" market
- ✓ need to be developed from TRL 4/5 to TRL 6/7

Further research is needed to optimize the product (mono-component), in particular its long-term stability after the production and before the application at different T-RH conditions

FAST TRACK TO INNOVATION PILOT

Call identifier: H2020-FTIPILOT-2015-1
Types of action: IA Innovation action
Cut-off dates: 1 December 2015

Partners

CNR-ISAC: Project Coordinator

CNR-IENI: Scientific Coordinator

3 SMEs: manufacturer, distributor/seller, restorer

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Thank you for your kind attention

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