



Nano-Cathedral

Nanomaterials for conservation of European architectural heritage developed by research on characteristic lithotypes

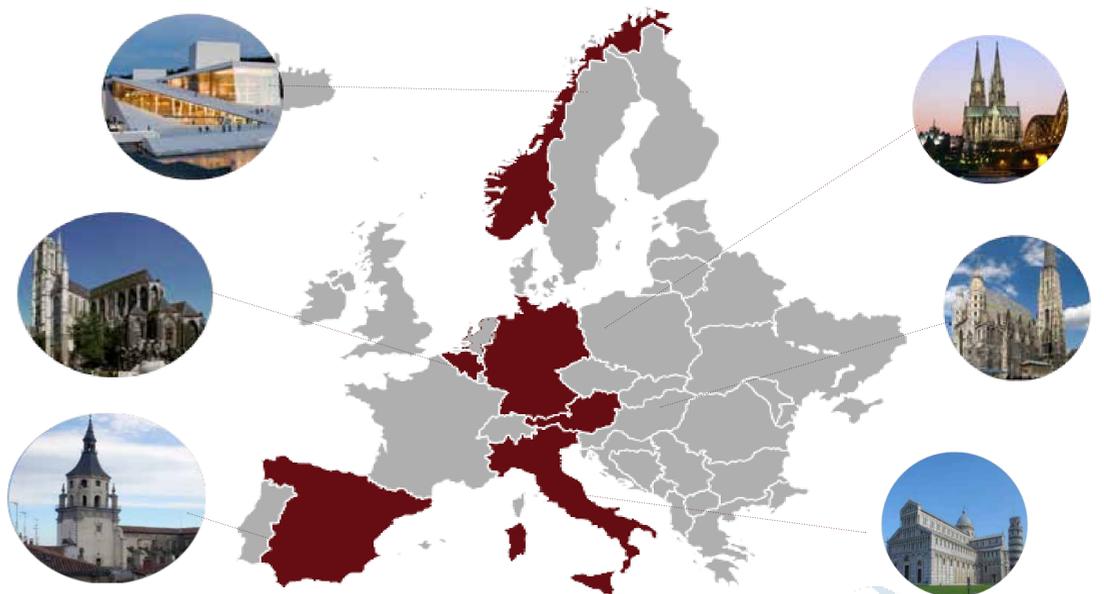
Innovation for Europe
Cultural Heritage
Protection and
Conservation

NANO-CATHEDRAL develops new **nano-materials, technologies** and **procedures** for the conservation of deteriorated stones in monumental **buildings, cathedrals** and **high value contemporary architecture**.

Innovation

- Innovative methods for consolidations, protection and pollutants decomposition
- A multidisciplinary approach to the development of affordable methodologies, to guarantee reliability of the whole value chain
- Sustainability since conception: LCA and LCCA drive the development

Selected Lithotypes



Goals

- **Preserve the originality of the stone materials**
- **Provide high performance treatments**
- **Provide long-term conservation**

Impact

- Cultural**
- Social**
- Economic**

Materials

Based on the specific decay phenomena of the selected lithotypes, several materials are selected and pre-tested

Consolidants

- 15** 5 selected for further laboratory testing on selected lithotypes
- Reactivity of Nano-Particles (NPs)
- Combination of Teos with NPs
- Use of Nano-SiO₂ and Nano-ZrO₂ as consolidant
- Stabilization of Nano-Particles

Protectives

- 20** 6 selected for further laboratory testing on selected lithotypes
- Photocatalytic treatments based on Nano-TiO₂
- Anti-fouling treatments using Nano-silver
- Innovative functionalized nano-structured polymer particles

Testing

Artificially decayed lithotype specimens for lab tests are prepared:

- Assessment of major decay in naturally weathered states and artificial ageing procedures
- Selection of thermic ageing cycles for each lithotype
- Ageing of 144 stone specimens for each of the 6 selected lithotypes

Full Program Testing:

- A systematic testing program is performed for consolidant and protective treatments to select the best ones to be applied on-site
- ✓ Application of treatments on pilot areas of monuments
- Development of operational guidelines



Contacts

Project Coordinator **Andrea Lazzeri** a.lazzeri@ing.unipi.it
 Project Manager **Isella Vicini** isella.vicini@warrantgroup.it
 Dissemination Manager **Lisa Bregoli** lisa.bregoli@warrantgroup.it

www.nanocathedral.eu



Powered by Warrant Group srl

Partners



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 646178

