



## **Assessment of compatibility and durability of photocatalytic TiO<sub>2</sub> for stone coating**

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The use of Titanium dioxide nano-particles has received increasing attention in many fields as these particles can trap and decompose organic and inorganic soiling matter and air pollutants by a photocatalytic process, providing new functional properties in terms of self-cleaning and depolluting performances to the treated materials. Since recent years, the use of photocatalytic TiO<sub>2</sub> as external coating for natural stones has been allowed thanks to the fine-tuning of nano-titania preparation, overcoming the initial limits of application related to a necessary thermal treatment. Notwithstanding nano-titania benefits, the potential of its application as stone coating needs to be assessed with respect to basic requirements involved for any surface stone treatment, especially in the field of the preservation of historical-architectural heritage. They concern the harmlessness with respect to the original characteristics of the stones, the effectiveness and durability of the treatments themselves. In this work we present the study for the assessment of compatibility of Titania coatings applied to calcareous stones paying attention to their effects on chromatic properties, water absorption by capillarity, permeability to water vapour, water wettability. The durability of the coatings under mechanical action in laboratory simulated conditions was also investigated.