

Novel photoactive nanomaterials and technologies for environmental cleaning-new solution for culture heritage protection

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Motto : Light is helping to save our culture heritage

MADRID , 25.June 2019




PHOTOSCALING. MADRID CITY COUNCIL ACTIONS

A1	Preparation of two pilot scale platforms: Public call
B1	Selection of the elements of the demonstration platforms
B8	Obtaining permissions, validation and implementation of the tool developed
C2	Monitoring the socio-economic impacts
D1	Notice boards
D4	Workshop, seminars, training and awareness activities
E1	Project management
E2	Networking with other projects

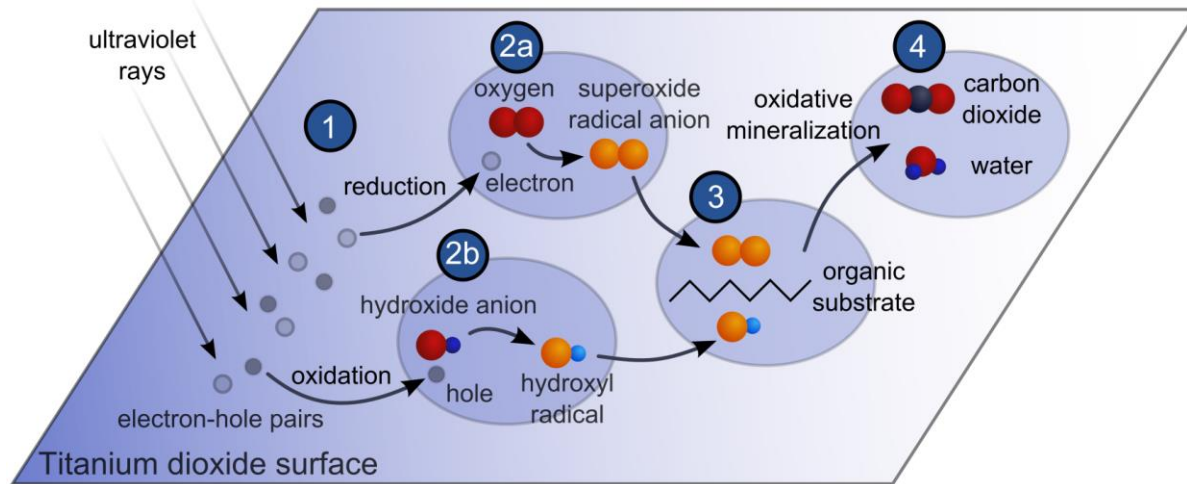




Country code	Beneficiary short name	Total costs of the actions in € (including overheads)	Associated beneficiary's own contribution in €	Amount of EU contribution requested in €
ES	MCC	123,024	61,512	61,512
TOTAL All Beneficiaries		1,761,341	898,171	863,170

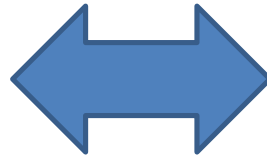
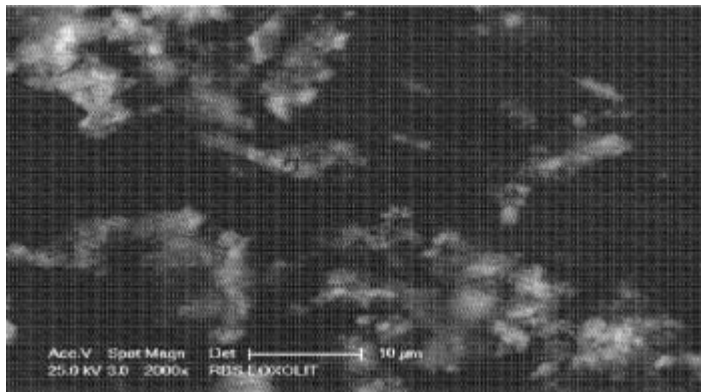
Principles of solar cleaning (photocatalysis)

Sun light can remove impurities (organic origin too) from surface treated by photoactive material

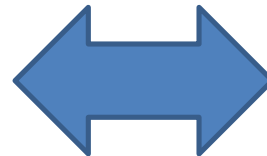
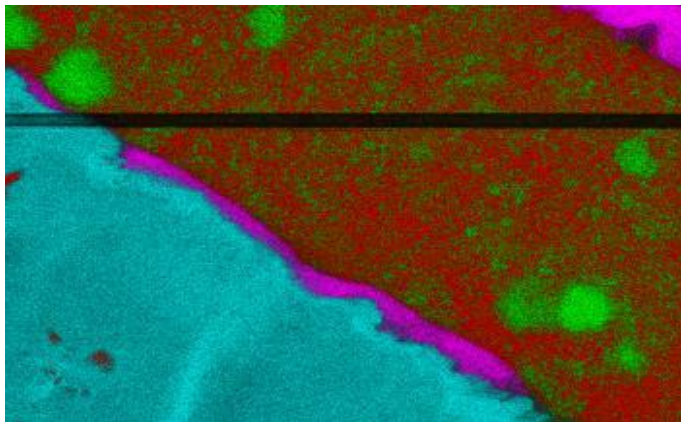




Nano –composite with photoactive function



The patented composition colloidal solution of titanium dioxide and nano-silica ($\text{SiO}_2 - \text{TiO}_2$) is shown on the upper microphotograph. The uniqueness of this material is in coating of titanium dioxide with nano silica and thus remaining on the photoactive surface.



Elemental map of sectional layer of paint based on $\text{SiO}_2 - \text{TiO}_2$ on an aluminum substrate. The meaning of each color is as follows: Si - red; Ti - green; C - purple; Al - cyan. The coating layers are clearly visible green TiO_2 particles in red SiO_2 matrix. Purple color interlayer between the Al pad and the organic layer of paint causes better paint adhesion.

Photoactive coating system

BALCLEAN

Balclean system is always modified according to each application .This is also valid for technology of coating

Eg. Sampling of attacked surface is necessary and test of application technology is also recommended (spraying ,roller coating .





MICROORGANISM TESTING





NANOTECH SYSTEM FOCUS

■ Buildings attacked by algae



■ Concrete constructions



■ Historical monuments





BUILDINGS ATTACKED BY ALGAE AND MOLDS





SOLUTIONS

- Application of research results in practice
- Application of photoactive coatings on building facades affected by microorganisms





REALISATION EXAMPLES



PRAHA AS WELL AS CZECH REPUBLIC IS RICH FOR CULTURE
MONUMENTS

PRAHA IS FULL OF MISTERIOUS STATUES SHOULD BE KEPT FOR THE
NEXT GENERATION -COOPERATION WITH GHMP STARTED





HISTORICAL MONUMENTS



Test of function of photoactive coating on sandstone lantern , which becom green because of algae deposition –part of lantern is coated ,photo taken after 2 months

DIRECT TREATMENT BY PHOTOACTIVE COATING

Angel - limestone



PREVENTIVE TREATMENT BY PHOTOACTIVE COATING

Time is taking beauty away – artificial sandstone



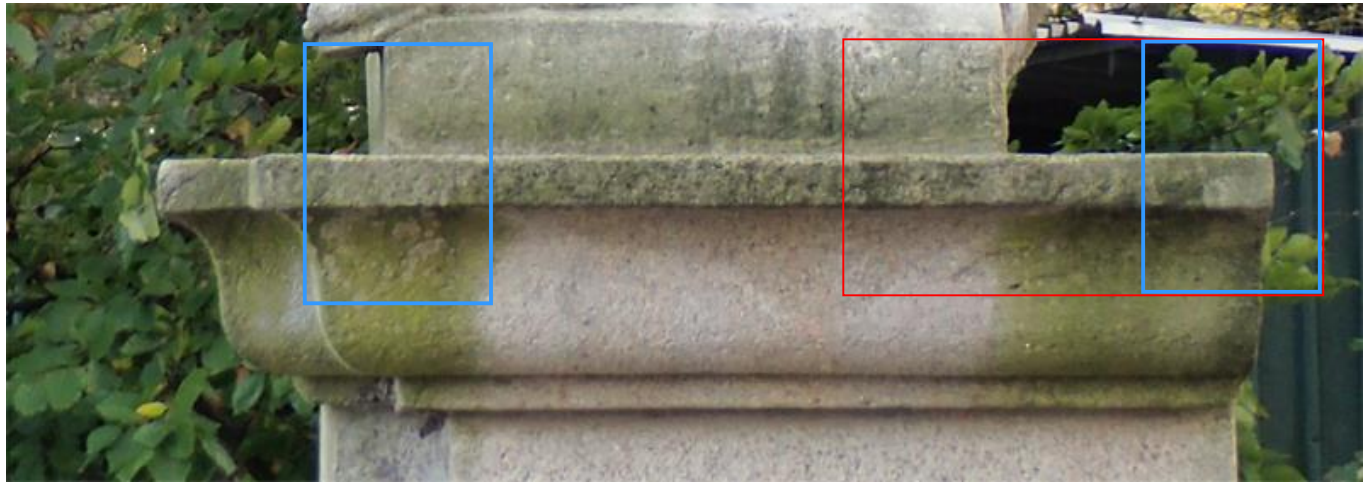
PREVENTIVE TREATMENT BY PHOTOACTIVE COATING

Statue of Jaroslav Vrchlický – sandstone



Chemical – Solar cleaning treatment comparison

before



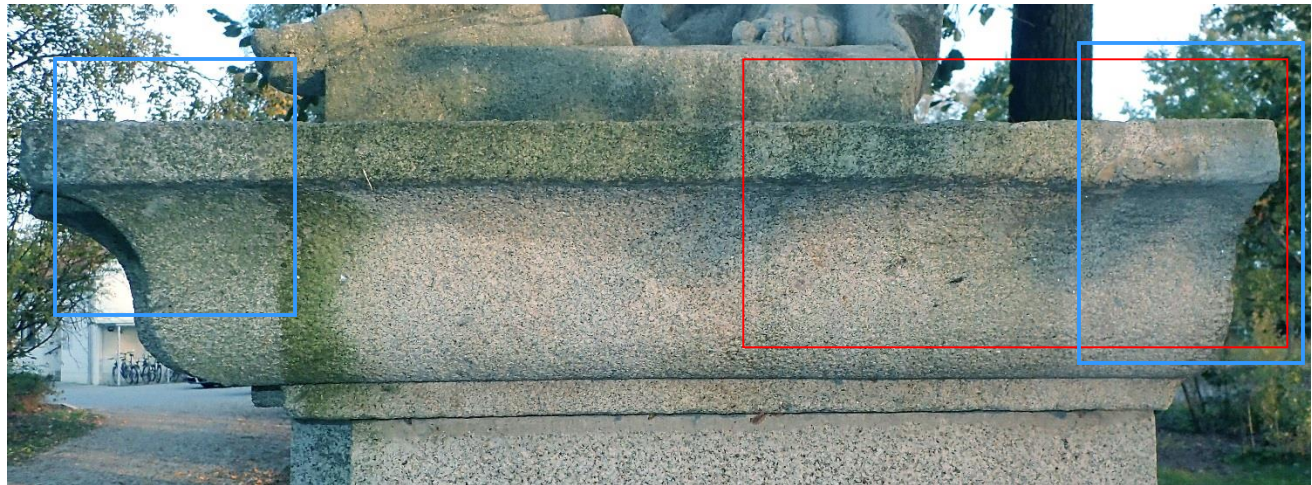
SAVO 1:2



Balclean



1 year later



Chemical treatment does not guarantee permanent function , algae appears again



nanotec
S Y S T E M



Thank you for your attention.

