Using the Power of Light to Clean

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PURETi has commercialized a proprietary form of water and titania based spray products that transform virtually all material surfaces into self-cleaning air purifiers. This means….

Reverses Pollution – concerting external surfaces and architecture into smog busters

Preserves our Aesthetics – by instantly oxidizing grime to keep surfaces clean

Saves Cost, Water, & Energy– by cutting cleaning cycles and time by >50%

Improves Indoor Air Quality – reducing VOC's and Allergens and promoting Wellbeing in the Workplace

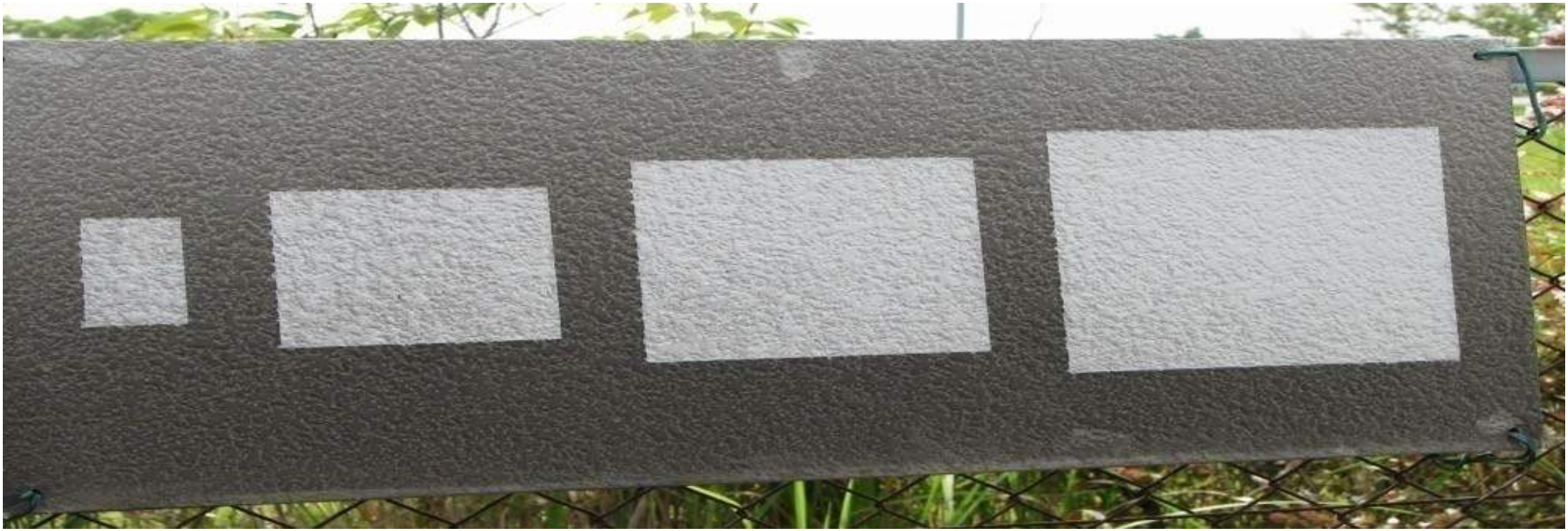
PURETi Application

PURETi can be spray applied on almost any existing surface

- It dries to form an invisible film – so clear it can be applied to glass!
- It is extremely durable, cost effective, and sustainable

6 Months

‘A white concrete panel treated (central squares) with PURETi and placed adjacent to a California freeway’



6 Months


A Toll booth in Japan. The whole of the concrete barrier was painted white with central area treated with PURETi

PURETI – On Glass

Glazing Sample:

On a 3° Pitch.

PURETI – On Glass

North facing window, treated February 2013

March 2013 after rain event

PURETI – On Glass

Same window.

3 Months

Thames Water:
Farmoor Reservoir, Oxford.
Self cleaning surfaces trial.

Trial date 1/8/2012

Photo date: 1/11/2012

Location: Reservoir Edge

3 Years

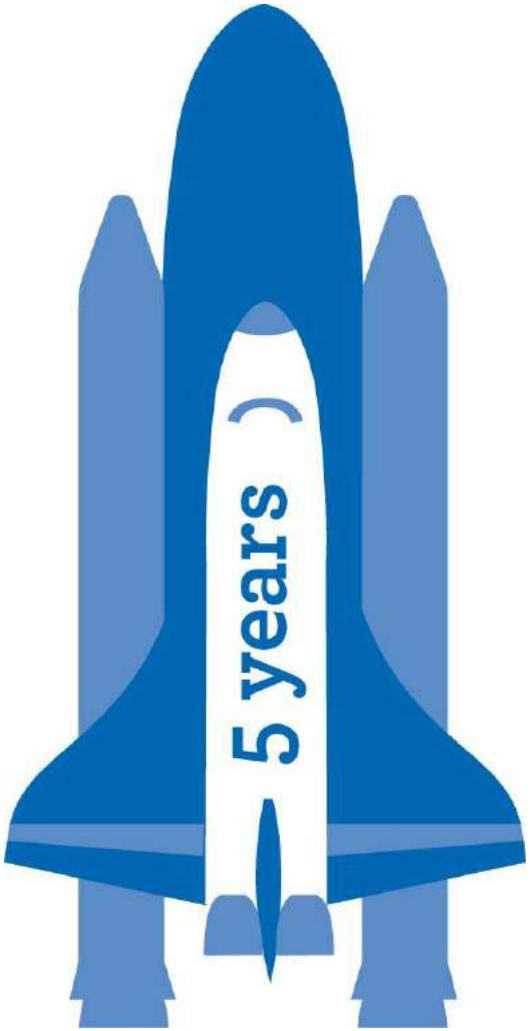
3 Months

A **NASA** Dual Use Technology Partner. Tested for the last 5 years.

A **US FDA*** Type 2 Approved Medical Device

Certified by **NSF International**

Approved by **EU SCCS****



*Food & Drugs Administration ** Scientific Committee for Consumer Safety)

£ Cost Reduction

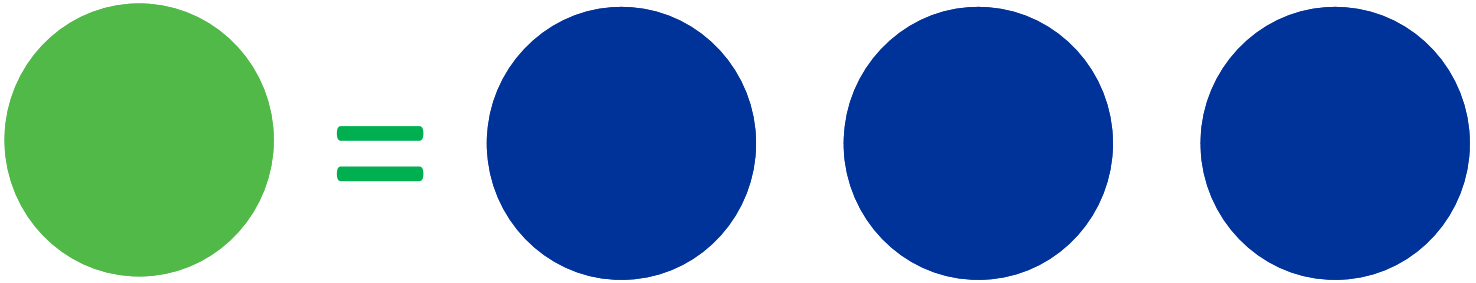
Glazing
Roofing
Facades
Awnings
Solar PV / Thermal

PURETi solutions are proven to reduce maintenance costs – by as much as **50%** - and extend product lifecycles.

By reducing the need for regular cleaning and servicing PURETi can save money on any organisation's bottom line and help drive profitability.

Regime Reduction

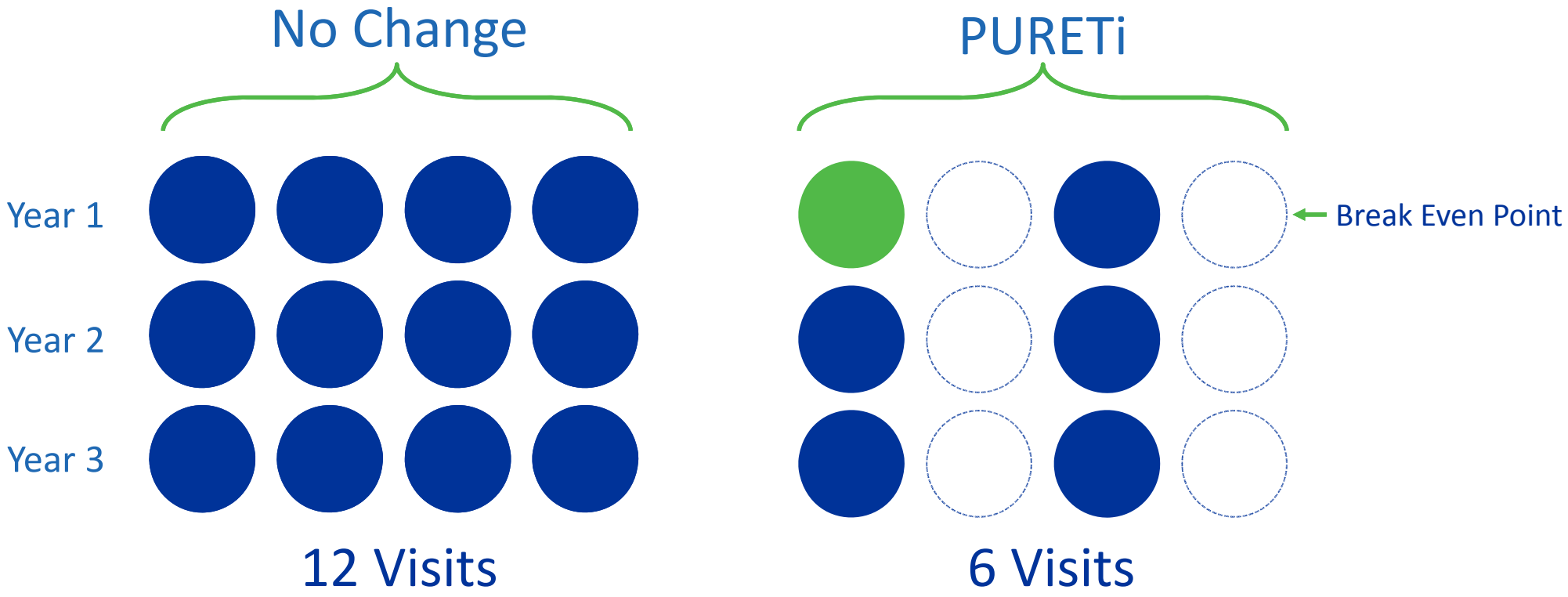
1 PURETi Application = Cost of 3 Normal Cleaning Visits



PURETi Clear Business Case

Regime Reduction

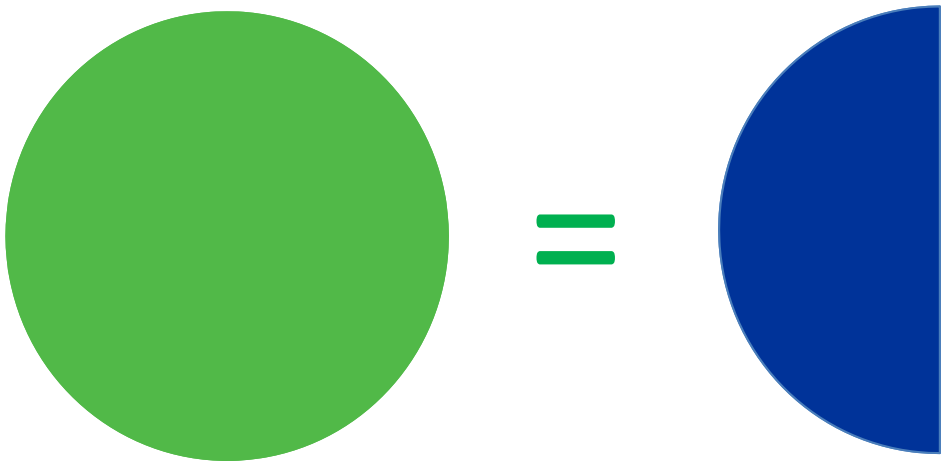
4 Visits per Year / 3 Year Period



PURETi Fresh Business Case

Regime Reduction

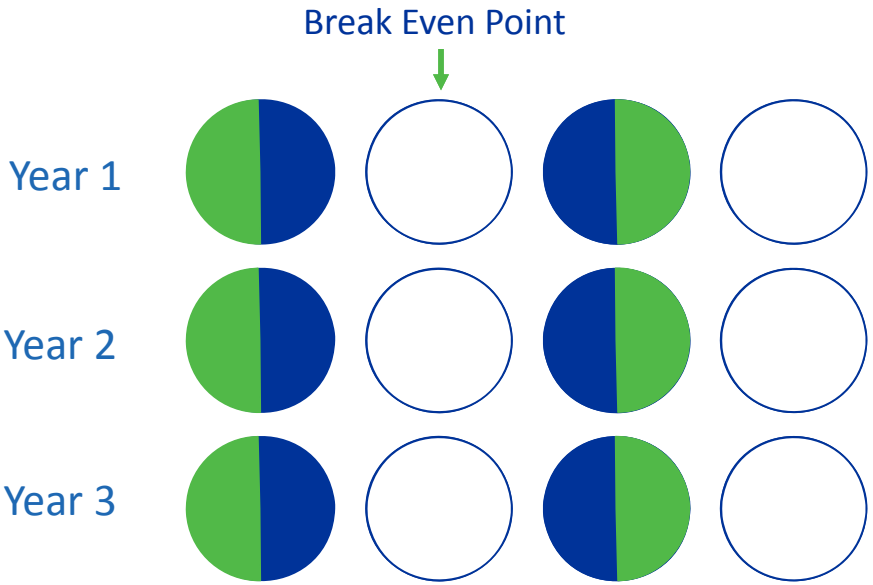
1 PURETi Fresh = < ½ cost of Normal Cleaning Visit



PURETi Fresh Business Case

Regime Reduction

Quarterly Scenario: 4 Visits per Year / 3 Year Period



6 Visits

Over 3 year Contract

Fresh Incorporated Into 1st & 3rd Annual Cleaning Visits

2nd & 4th Visits Not required.

Future visits reduced by 50% (12 down 6 visits)

£

Equates to a 25% Cost Saving Per Annum

Improving Air Quality

PURETi treated surfaces work with nature to purify air quality including:

Volatile Organic Compounds (VOCs)

Smog incorporating NOx and organic Particulate Matter.

Odours from methane – such as tobacco smoke, human and agricultural waste.

Methane / Formaldehyde

Indoors on windows and lighting

Outdoors on building exteriors, hardscapes, asphalt and concrete.

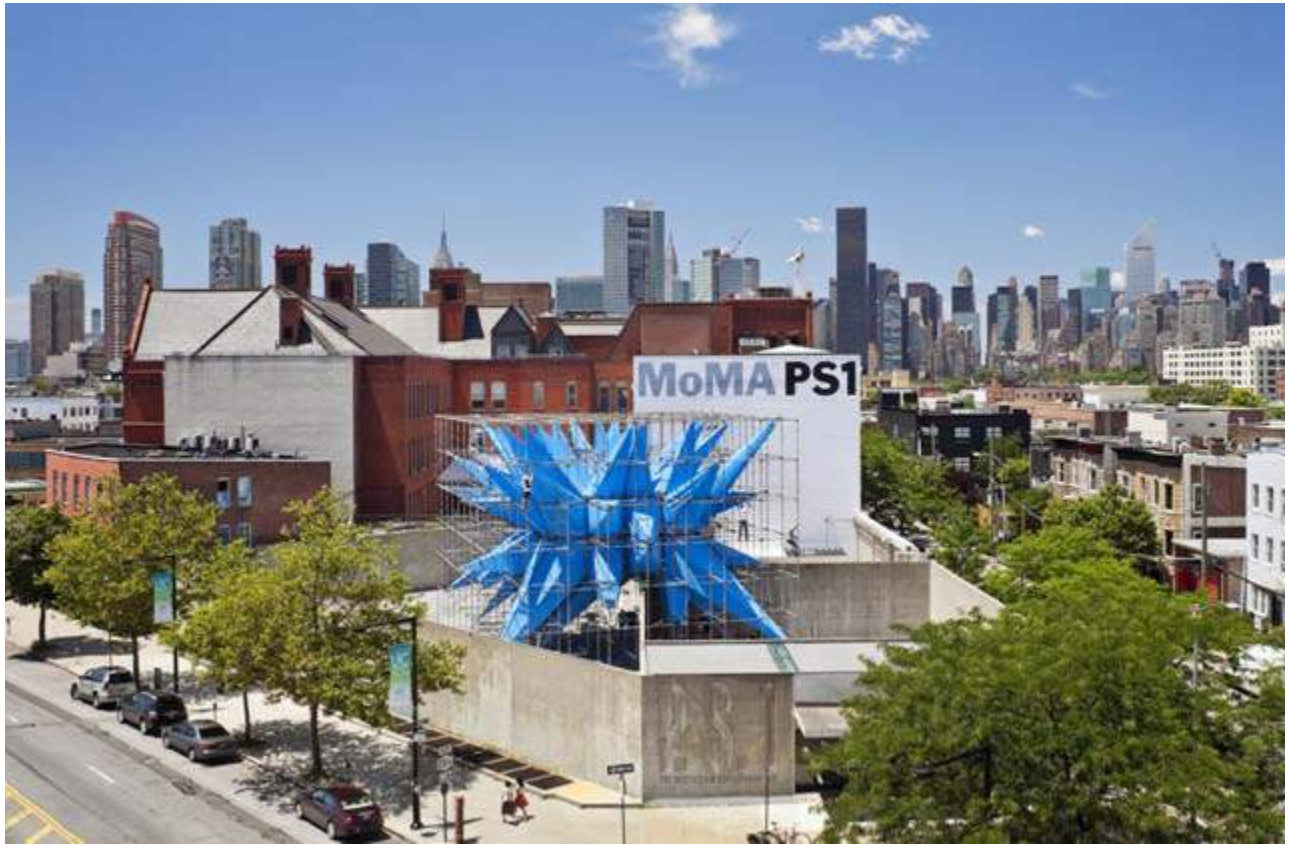
Smog Eating Architecture

Dives in Misericordia (Rome) by US Architect Richard Meier.

Structure and sails were constructed using photo-active cement.

This was the first use of PCO technology by architects to reduce air pollution and preserve intended appearance.

Smog Eating Architecture



Wendy at MoMA PS1 (by US architects HWKN.

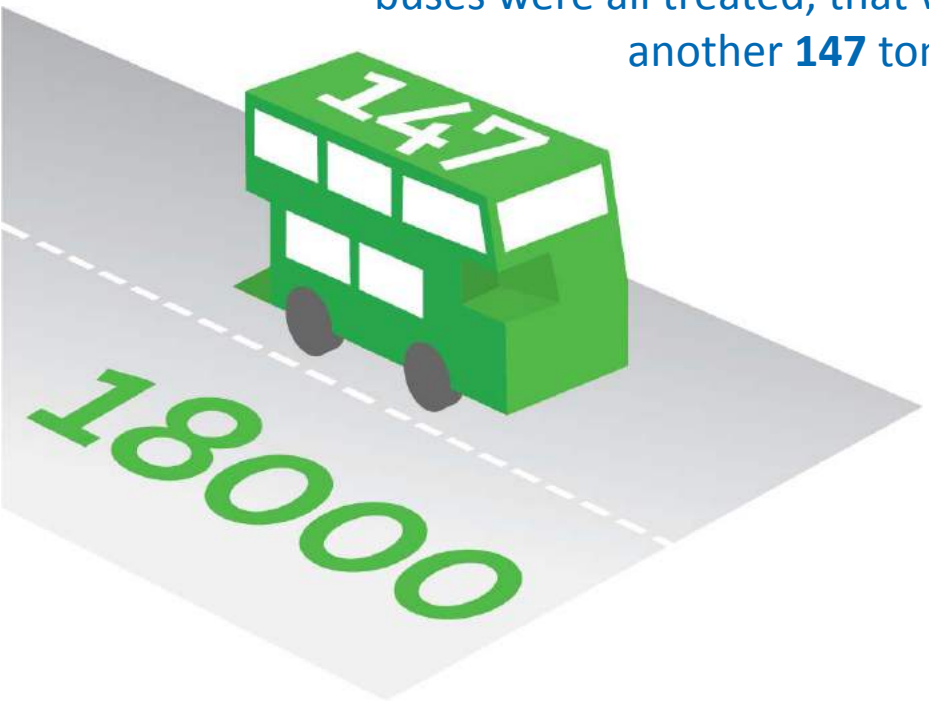
Wendy was the 2012 winner of the annual Young Architects Program (YAP) at MoMA PS1. It was an experiment to test how far the boundaries of architecture can expand to create ecological and social effect.

PURETi treated the nylon fabric to neutralize airborne pollutants.

During the Summer of 2012, **Wendy** reduced pollution to the annual equivalent of taking 260 cars off the road. **PURETi treated Wendy** was rebuilt in 2013 in Abu Dhabi Sustainability Week.

Outdoor Air Quality

If all of London's roads were treated, that would be **18,000 tons** (that's the Mayor of London's air quality target for 2015 achieved then). If London's buses were all treated, that would be another **147** tons a year.

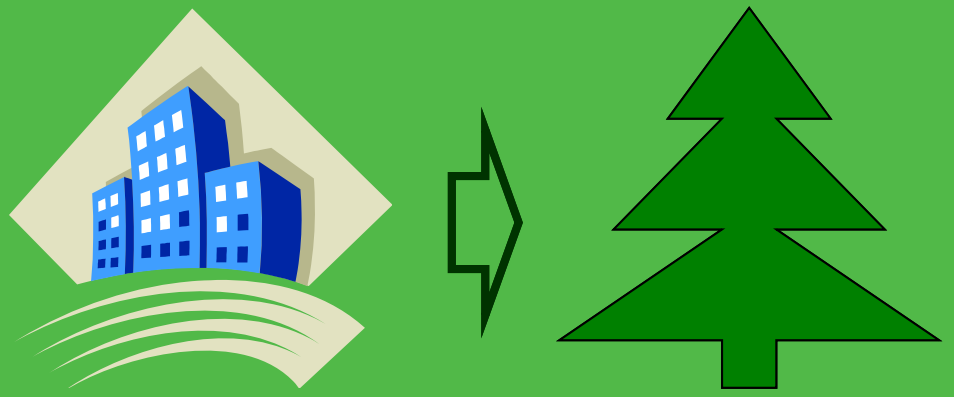


1m² = 200g Nox
(Nitric Oxide / Nitrogen Dioxide)

1 mile of road = 1 tonne NOx p.a.

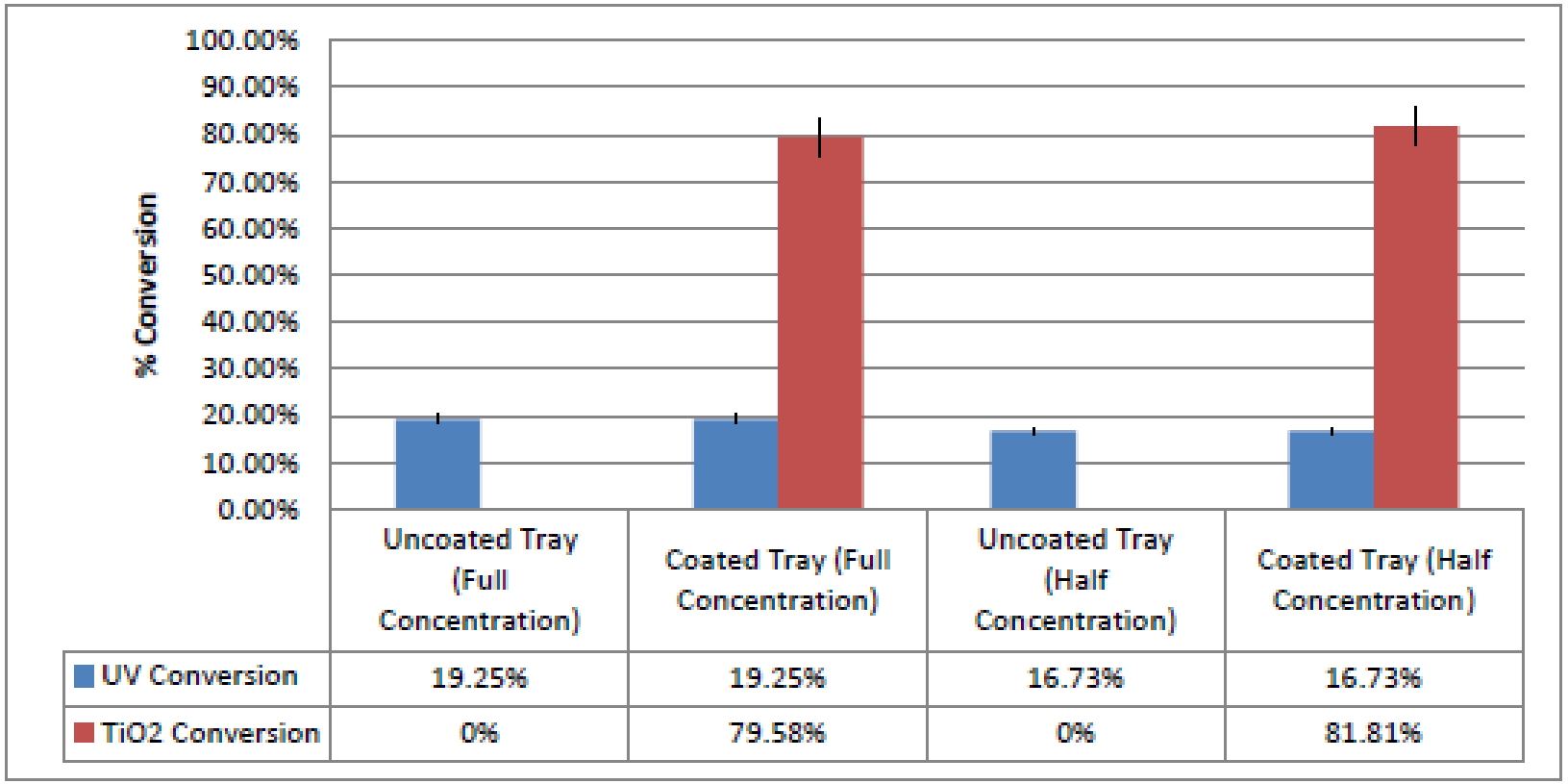
3.6 acres of trees

80% NOx removal



Buildings = Trees

Outdoor Air Quality *US Research*

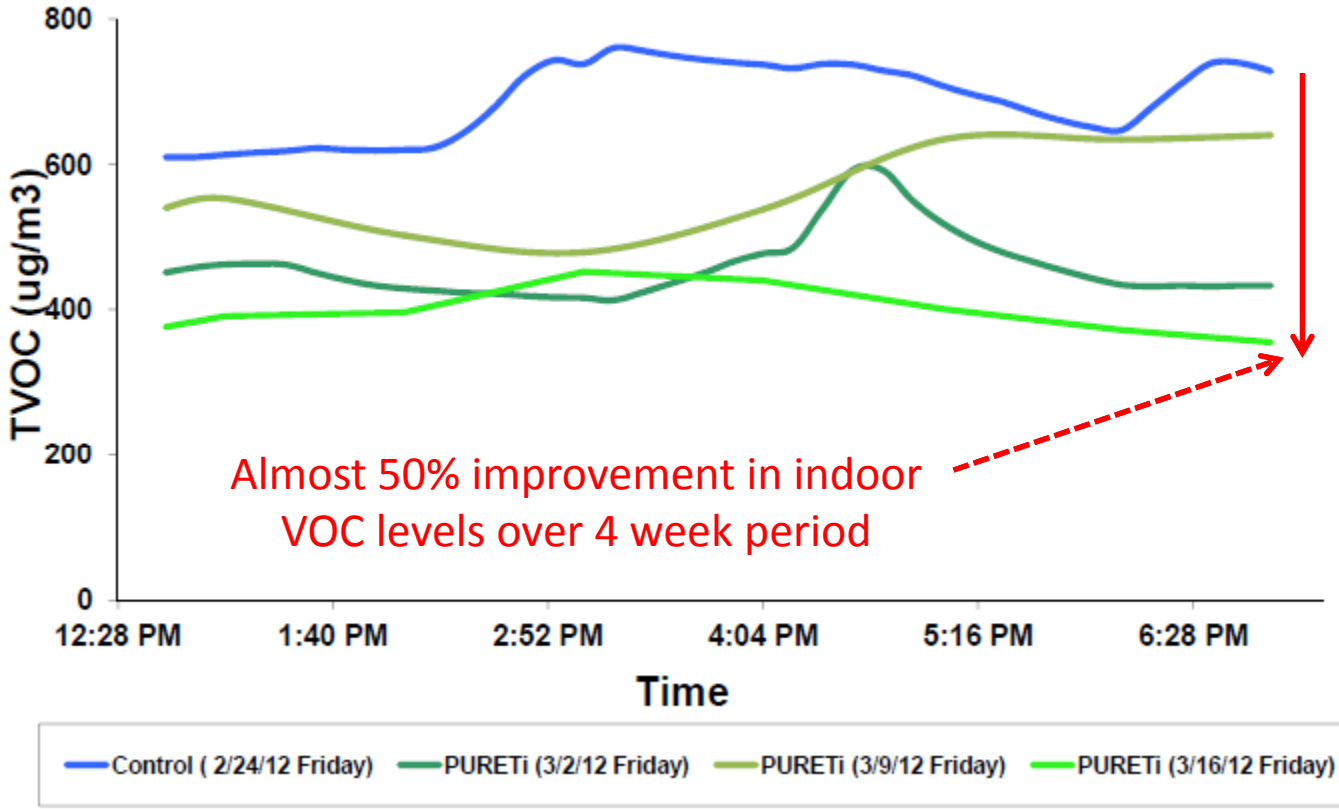


	Uncoated Tray (Full Concentration)	Coated Tray (Full Concentration)	Uncoated Tray (Half Concentration)	Coated Tray (Half Concentration)
UV Conversion	19.25%	19.25%	16.73%	16.73%
TiO2 Conversion	0%	79.58%	0%	81.81%

Figure 5 : NO_2 conversion comparison between the uncoated and coated pyrex trays

Indoor Air Quality

660 Madison Avenue – 4 Week TVOC* Trial February 2012



*Total Volatile Organic Compound

pureti UK

Health and Wellbeing

PURETi helps restore and maintain a healthy living and working environments.
Clinically proven to reduce the risk of infection, allergies and disease.

Indoors on windows and lighting

Outdoors on building exteriors, hardscapes, asphalt and concrete.

FDA **Type 2 Approved Type 2 Medical Device**

Protecting Aesthetics

Beautiful architecture and design can be protected and easily maintained. Entire streetscapes, from buildings to signposts, road markings to advertising billboards, can be kept cleaner for longer, ensuring greater efficiency.

Self-Cleaning Art

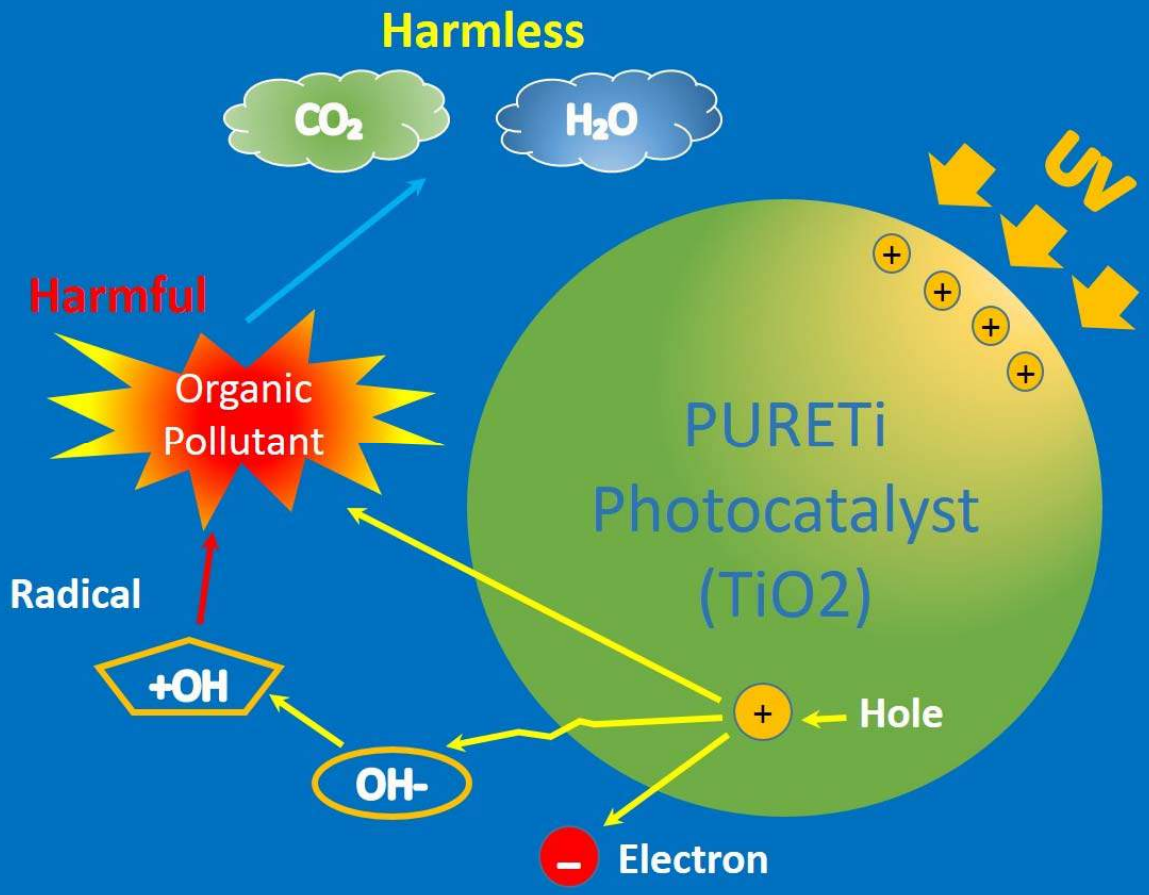
Johnson Controls (JCI Milwaukee HQ)

This 1,400 piece acrylic mobile was designed by **Gensler** architects and installed 4 stories up in a well lit, but hard to access, corporate atrium. No plans were made for ongoing maintenance.

PURETi technology was applied in 2012 to improve IAQ and preserve intended appearance – dust free. Based on the success of **PURETi** on this project, the JCI Building Efficiency Group is now endorsing **PURETi** to all its key accounts.

UV PCO / Ultraviolet Photocatalytic Oxidization

the opposite of photosynthesis.



A natural process whereby Ultra-Violet light energy reacts with the mineral Titanium Dioxide (TiO2), triggering a chemical process that safely and instantly oxidizes or breaks up organic matter at a molecular level.

As a catalyst, TiO2 continues to work and is not consumed in the process.

Titanium Dioxide

9th most common mineral on the planet

Widely used as a whitener or sun block in such products as :

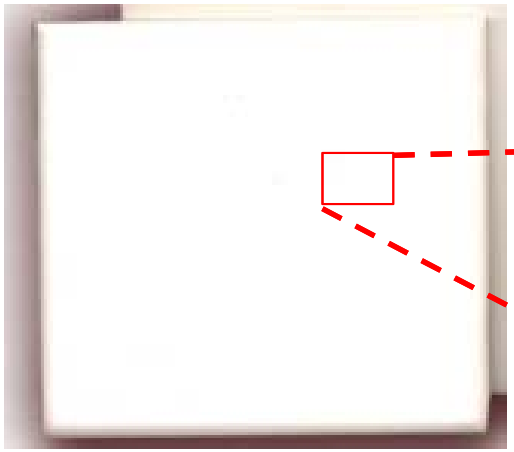
- Toothpastes and aspirin– 2% by weight
- Sun Screen Lotions – 8%-25% by weight
- Paint – 1.5 pounds per gallon

FDA approved as a whitener or a sun block

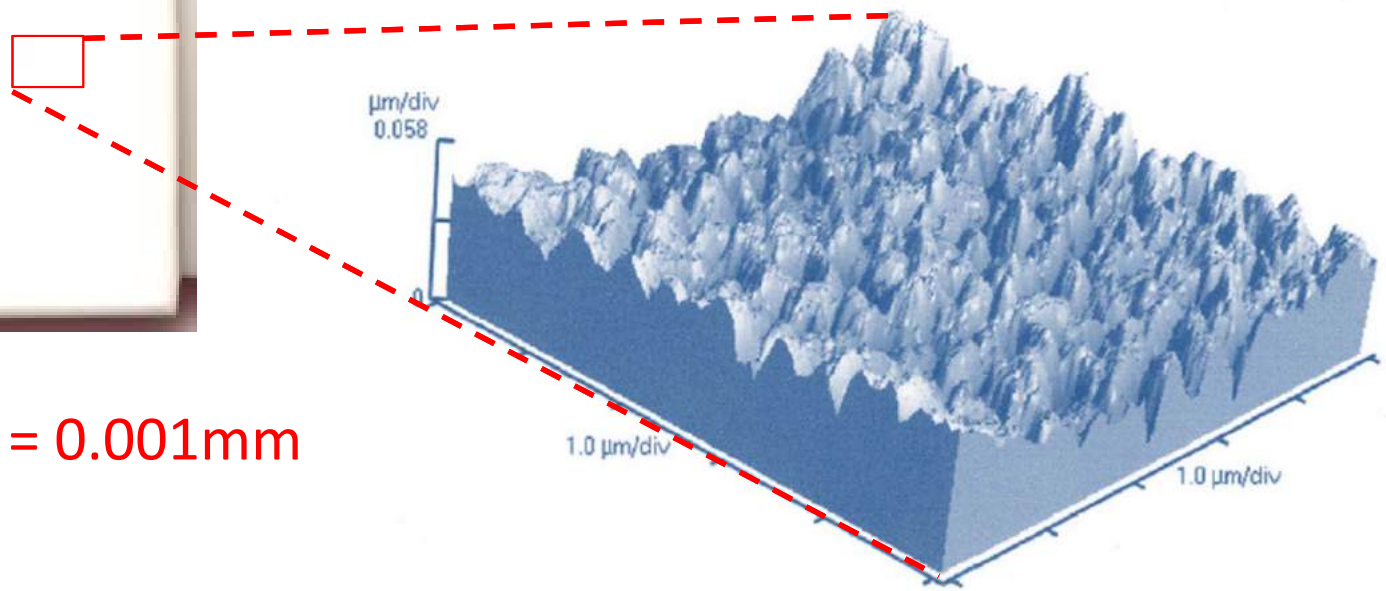
European Science Commission approved

Molecular Science

On application PURETi forms a 40nm (nanometre) thick layer on the surface. 10-20nm crystals bond within pits & pores on the surface.



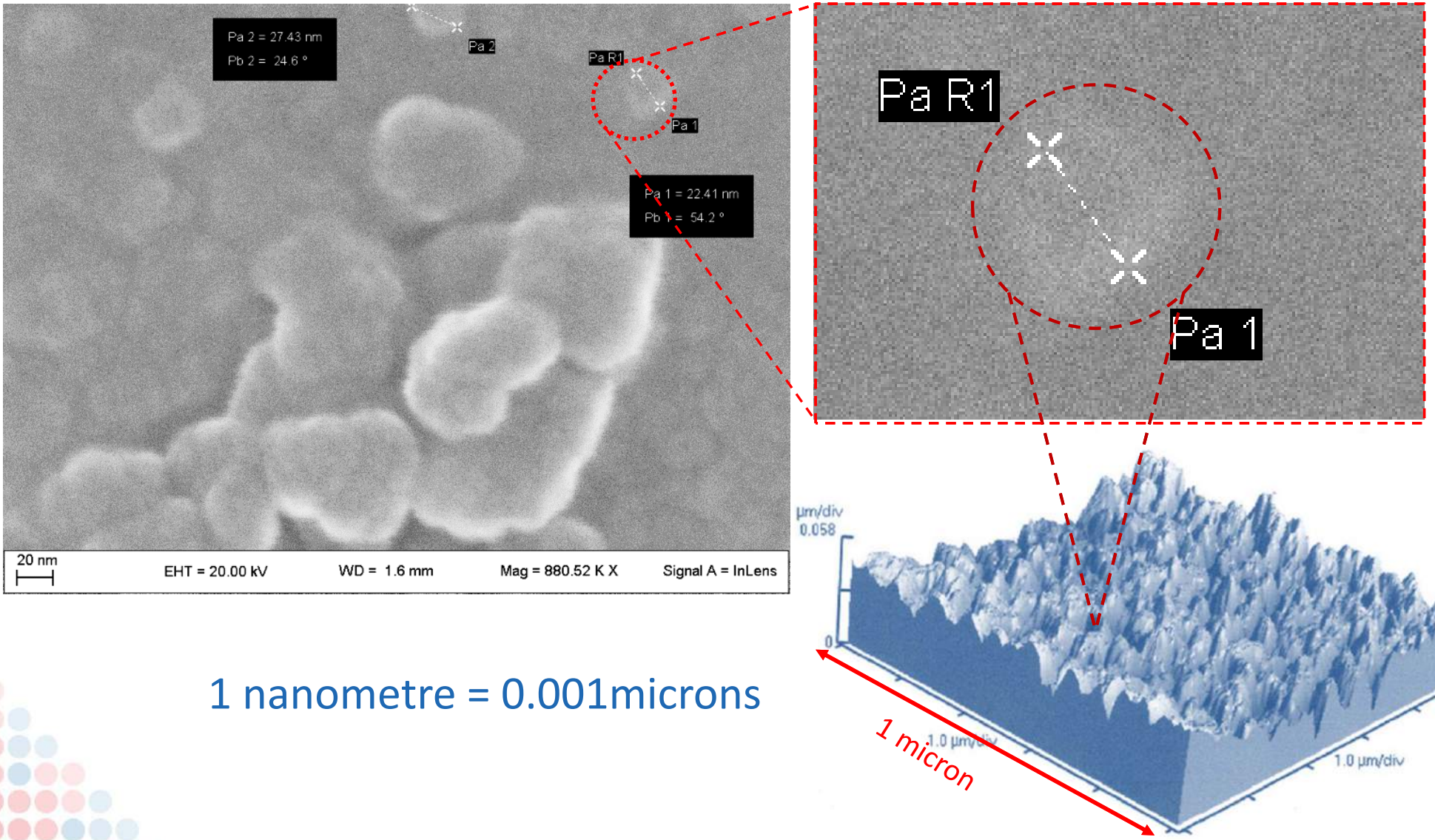
Surface area of a ceramic tile @ 1 micron



1 micron = 0.001mm

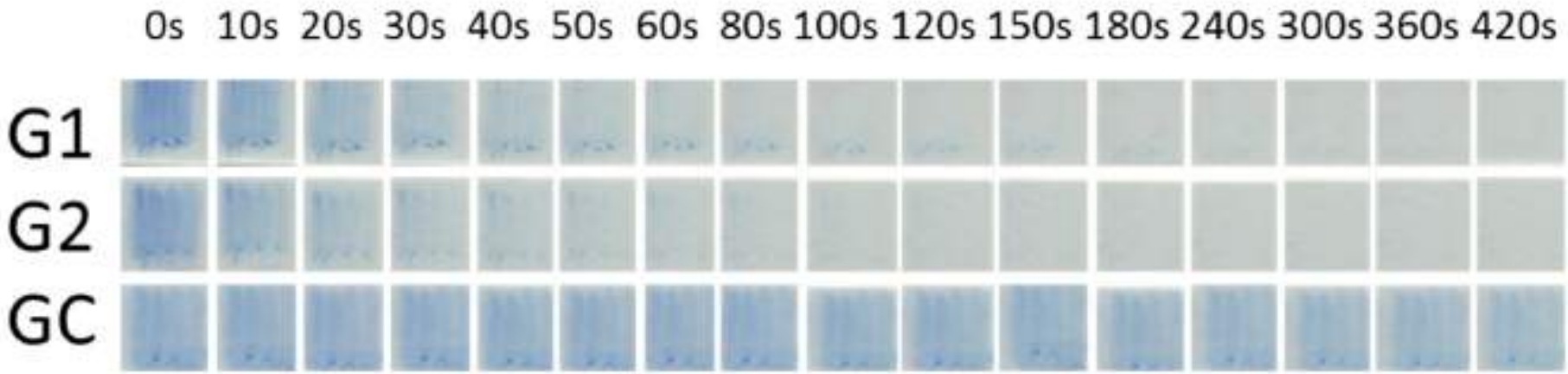
Molecular Science

A 20 nm crystal.



1 nanometre = 0.001microns

PURETI – Self Cleaning Test



A series of images of BB marked PURETi Coated glass samples. Ink on control (GC) not affected by UV irradiation*

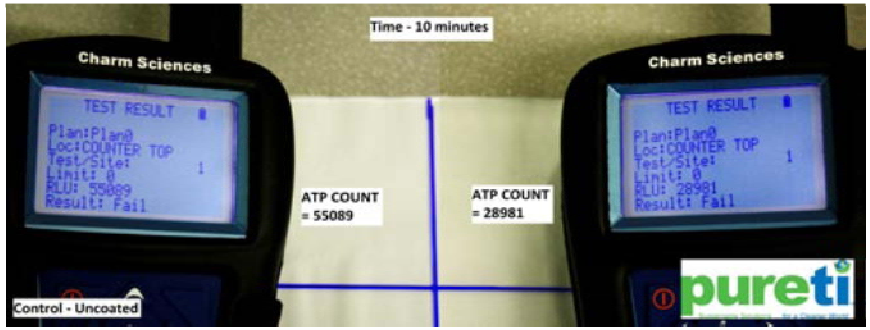
*Undertaken by Queens IPS / Belfast University November 2013.

Hygienic Surface Test Method

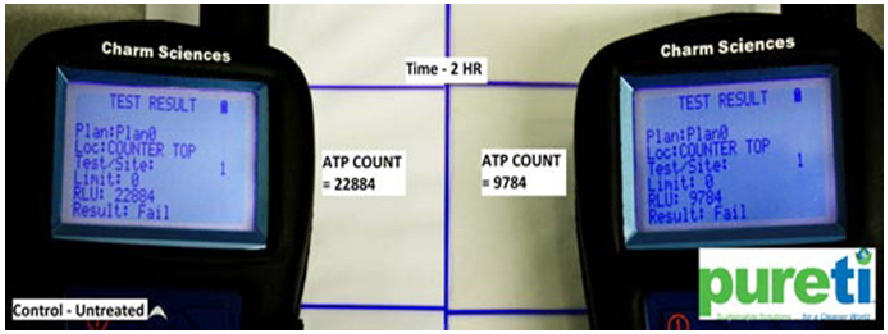
Test Method: PURETI applied to half of clean ceramic or glass tile. Diluted milk is spread across tile. Tile is exposed to light. ATP (an energy carrying molecule present in all living cells) levels are measured.

Result: Bio Stasis – ATP dropped 50% in 10 minutes on treated slide. After 16 hours, organic load dropped 97% on PURETi side; while increasing 34% on untreated side.

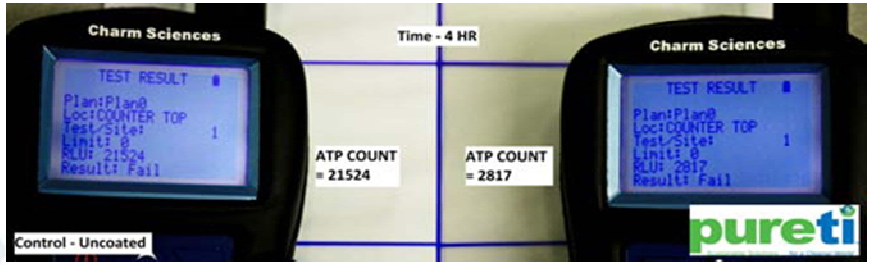
10 Minutes Control 55,089 / PURETI 28,981



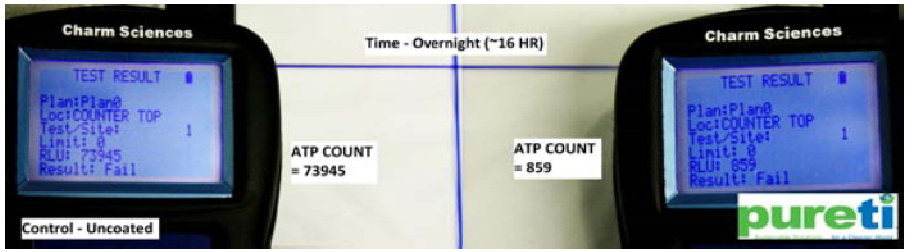
2 Hours Control 22,884 / PURETI 9,784



4 Hours Control 21,524 / PURETI 2,817



16 Hours Control 73,945 / PURETI 859



PURETI – Water Sheeting

Test Method: PURETI applied on half of clean glass plate. Glass is exposed to light. Water is sprayed across entire tile. Photos are taken. See below.

Result: Water Sheeting – PURETI changes the surface energy of glass to make it love or hug water. Water sheeted on PURETI treated side and beaded on control.

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Academic Endorsement…

"PURETI passed 3 years of lab testing and is now partnered with NASA in a "Dual Use Technology Agreement" **Dr. Lauren Underwood, NASA**

"PURETI's approach combines a sound fundamental science with a range of new and exciting applications, which are beneficial for environment while delivering a self-cleaning performance." **Professor Alexander Orlov - Materials Science & Engineering Stony Brook University, UN Advisor on Nanotechnology & Environment**

"The development and validation of this new class of UV-PCO coating has the potential to mitigate the higher levels of pollution due to the increase in traffic without affecting the surface characteristics of the pavement." **Marwa Hassan, Ph.D. Professor, Dept. of Construction Management & Industrial Engineering at LSU**

Awards / Further Endorsement

Winner 'Innovation in GreenTech 2011'

EDISON AWARDS
Honoring Innovation and Innovators

Winner 2012 -Material Science Award for Sustainability & Safety

KATERVA
FOR A SUSTAINABLE TOMORROW

"If the Nobel Society had an award for sustainability, it would resemble the Katerva Awards, a new international prize for the most promising ideas and efforts to advance the planet toward sustainability." (Reuters)