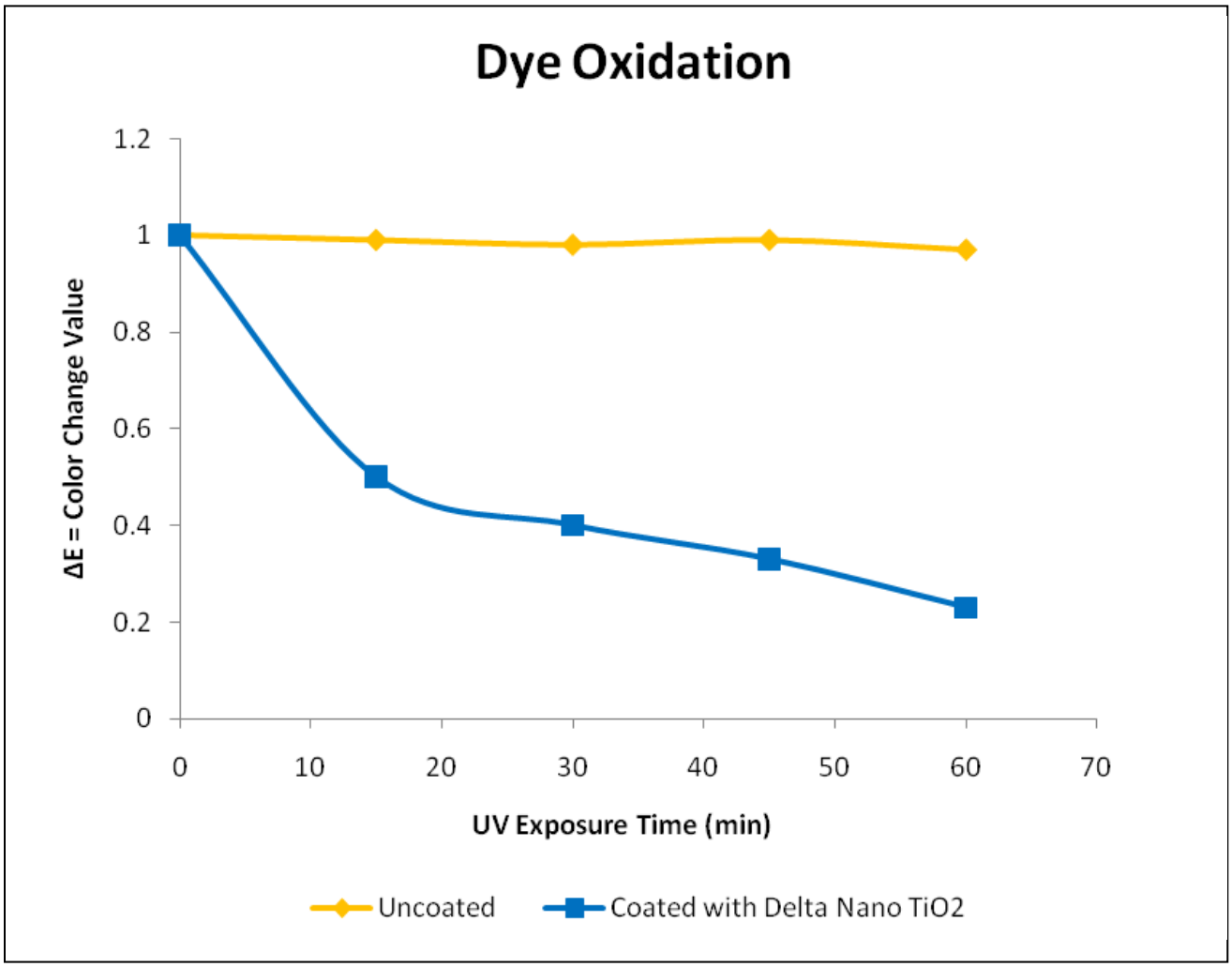
Test Results

Discolouration of organic blue dye upon exposure to UV – indicates decomposition effect on organic substances on coated samples.



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Test Report No: Delta/2009/DO-1
dated 20th Jan 2009

SUBJECT:
Dye Oxidation Test on Delta Nano TiO_2

TESTED FOR:
Delta Intercontinental Pte Ltd
38 Woodlands Industrial Park E1
06-04 Singapore 757700

SAMPLE DESCRIPTION:
The following items were prepared on 16 Jan 2009 as shown:
The test samples were applied by Delta Intercontinental Pte Ltd.

Sample/Substrate	Area of application	Quantity
Ceramic tiles coated with Delta Nano TiO_2	100 x 100 mm	2 pcs

TEST METHOD:

1. The ceramic tiles were cleaned with "Gif" cleanser, rinsed with deionized water and blown dry with compressed air.

2. Delta Nano TiO_2 was applied with a 0.4 mm air atomized spray gun and air dried overnight prior to dye oxidation test.

3. The dye used is Methyl Violet 6B (a solution) from BDH Chemicals Ltd Poole England. It was diluted 20 times with deionized water and sprayed using a 1.1 mm spray gun (about 7 passes) onto the samples to obtain a ΔE of 15-20 (measured using a colorimeter- X-rite SP60, Sphere spectrophotometer). ΔE (delta E) is a measure of a change in color and is calculated from the root of the square of the difference in L, a and b values ($\Delta E = (\Delta L)^2+(\Delta a)^2+(\Delta b)^2)^{1/2}$).

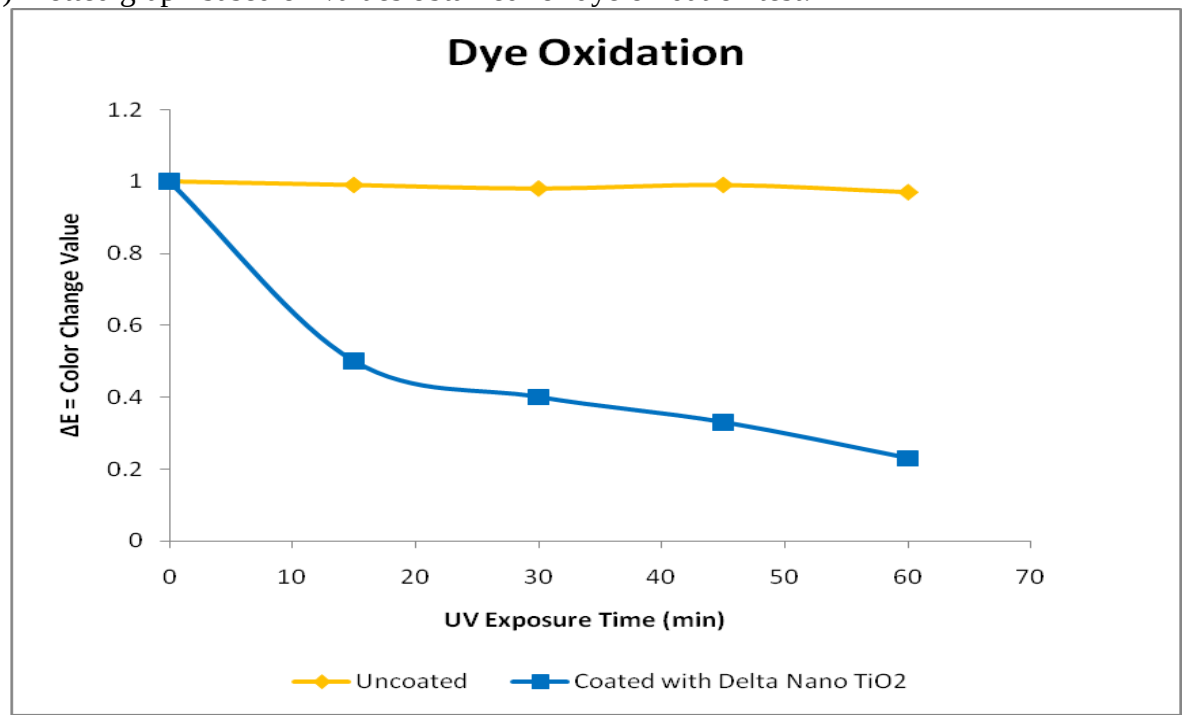
4. The samples were then exposed to ultra violet (UV) light of wavelength 365-400 nm with an intensity of 1.0 mW/cm^2. ΔE (delta E) was measured at 15 minutes time interval for a period of 60 minutes.

TEST RESULTS:

A) Dye Oxidation Test Result:

Time (min)	ΔE, Color Change Value	
	Control (Uncoated)	Delta Nano TiO2
0	1	1
15	0.99	0.5
30	0.98	0.4
45	0.99	0.33
60	0.97	0.23

B) Plotted graph based on values obtained for dye oxidation test:



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