IngeniaTouch Ltd

in pursuit of perfection

24 March 2022

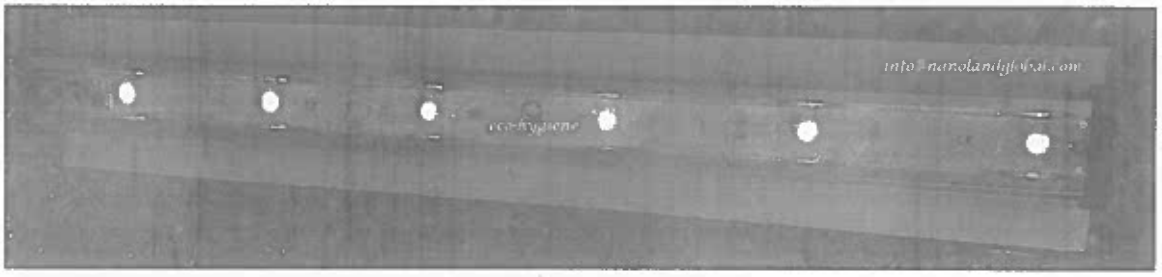

Figure 1 Removal of ammonia, methane, VOC's bacteria and viruses by light and natural Tio2 materials

Ammonia is a rather toxic gas (8-hour workplace exposure limit is 25 ppm) that is produced in animal husbandry and can also be emitted from concrete. It is harmful to humans, animals and the environment. This provides the motivation for removing it from interior air.

It is well known that ammonia can be decomposed thermally. Nevertheless, high temperatures are required to get a reasonable rate unless catalysts are used. Recent interest in using ammonia as a fuel (instead of hydrocarbons) has led to the development of catalysts; these applications are essentially for use with pure ammonia.

The decomposition of ammonia to constituent elements (nitrogen and hydrogen) requires less than a tenth of the energy required for decomposing water into oxygen and hydrogen, which was the original photocatalytic reaction demonstrated with titanium dioxide. Therefore, it can be expected that titanium dioxide-based products, of which there are many available today, are excellent coatings for the removal of ammonia, and this has indeed been demonstrated both for aerial ammonia and aqueous ammonia.

There has been much recent interest in harvesting the hydrogen (as part of the "net zero" agenda for eliminating hydrocarbon fuels) and for this purpose a metal cocatalyst such as platinum needs to be incorporated into the titanium dioxide, otherwise the hydrogen is oxidized to water.

For indoor air purification, however, it is preferable that the products are simple nitrogen and water, and for this purpose no metal cocatalyst is required.

Hence, coating interior surfaces (ceiling and upper parts of walls) with Tio2 coatings should provide an effective means of removing ammonia and harmful pathogens from the air. Appropriate light must be provided. Daylight is very effective, as is blue and violet artificial light. A quantitative

assessment needs be carried out in specific environments to ensure that the required performance is achieved. The main parameters of this assessment will be the rate of ammonia generation, the volume of the housing facility, the area of the Tio2-coated surfaces, and the intensity of the light and its spectral quality. The aerodynamics should also be assessed to ensure that the interior atmosphere is being well mixed.

Following extensive successful trials in Spain in poultry and pig facilities, where 90% of ammonia was eliminated (each farm treated required no further usage of antibiotics) we wish to open a dialogue to leverage this hygiene innovation for the benefit of Irish agriculture.

Kind regards

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