Visit Update to NanoBright Technologies Pte Ltd, Singapore

Abstract

Being one of the nanotechnology based companies in Singapore, NanoBright Technologies Pte Ltd has successfully developed their propriety platform technologies in fluorescent materials that include up and down conversion fluorescent nanoparticles and long after-glow phosphorescent materials. A few applications are being developed and almost ready for the market that include solar cells efficiency enhancement and agricultural application, fluorescent ink for security application, and long after-glow products for lighting and decorative application.

As part of NanoGlobe's effort in investigating the Singapore nanotechnology capabilities, our team visited NanoBright Technologies Pte Ltd, a young spin-off company from the National University of Singapore (NUS) Prof. G.M. Chow's research laboratory. NanoBright's main focus is commercializing fluorescent materials technologies. In 2008 NanoBright was awarded SGD250K by the SPRING Singapore TECS[1] grant scheme for its Proof-Of-Concept (POC) proposal on the topic of solar cell performance enhancement by employing down-conversion nano-phosphors.

NanoBright has developed their propriety platform technologies that include the fabrication of fluorescent nanoparticles to convert near Infra-Red (IR) to visible light (up conversion) and Ultra Violet (UV) to visible light (down conversion), as well as the fabrication of long after-glow phosphorescent materials. In the area of fluorescent films, NanoBright has identified their core capabilities that include the fabrication of the fluorescent nanoparticles, incorporation of the nanoparticles into EVA film, and the encapsulation process for the solar cells. The fluorescent EVA film will then be able to convert unused UV sunlight incident on its surface to visible light suitable for absorption by the solar cells and at the same time prevent any scattering of light. This is essentially the main activity done for the POC work to enhance the solar cells efficiency. Laboratory scale fabrication and encapsulation process have been completed and they are now in the last characterization stage of the films. NanoBright is thus ready to work with EVA film manufacturers in this field to commercialize their fluorescent film.

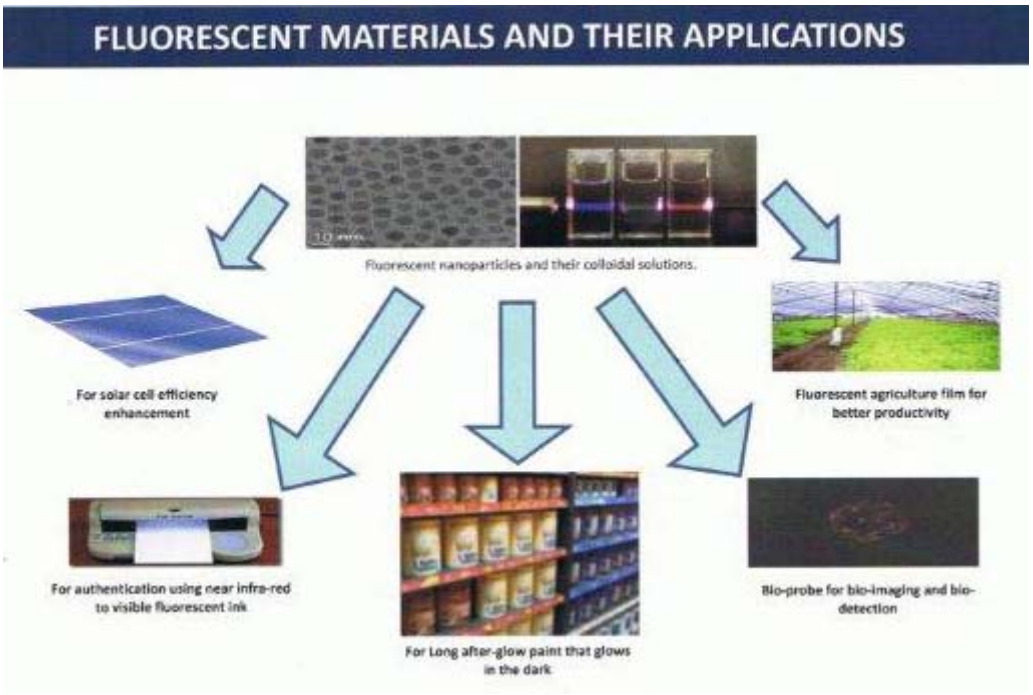
Beside solar cells application, the fluorescent film can also be applied for agricultural film to provide the favourable red or blue spectrum from the UV sunlight to enhance the plant growth. Since the film

[1] Technology Enterprise Commercialisation Scheme

is made of inorganic fluorescent materials instead of organic fluorescent dyes, the film will have a longer stability period, thus longer lifespan. NanoBright is now working with one of Singapore's polytechnics to obtain the necessary certification from the TÜV SÜD PSB Pte Ltd (an established and internationally recognized testing body for quality system certification).

Working on the long after-glow phosphors, NanoBright is collaborating with Nippon Paint to develop long after-glow paint for both indoor and outdoor use that can absorb light during the day and emit light in the dark or night for up to 24 hours. NanoBright is also developing long after-glow tiles and plastics as alternatives for lighting, signage and decorative purposes. In addition, NanoBright has successfully developed fluorescent ink that will not degrade upon much exposure to UV light, for security purpose as well as thermal sensor. The ink is currently being sampled by their potential customers and partners. Their security ink can be applied for anti-counterfeiting on currency notes and anti-copying on copyright pages, while their thermal sensitive ink is able to change colour as an indication of temperature change. The operational range of temperature is within 31-50^{o}C.

In summary, NanoBright Technologies Pte Ltd has established their capability in fluorescent technologies and is actively seeking for and working with the right partners and collaborators to develop their fluorescent based products even further for innovative and profitable applications.



Fluorescent materials and their applications, developed by NanoBright Technologies Pte Ltd