Eco-friendly and Smart Nano Coating Materials from SUNCOAT

Abstract:

Nanotechnology enables energy saving and high performance coating materials. NanoGlobe interviewed another interesting company SUNCOAT, a European high-tech company specializing in developing functional films using nanoparticle coating technology. SUNCOAT'sfunctional films dispersed with nanoparticles are superior in IR absorption, UV protection and electrical conductivity. Their heatstop foils can be used as exterior coating of greenhouse, automotives and roofs of industry plants for heat protection. SUNCOAT works closely with companies such as EVONIK industries AG and government organizations in Abu Dhabi to bring their product in the market place.

We live in a clean and beautiful but hot city – Singapore. Like most of the hot cities in the world, air conditioning is used everywhere in this city, from homes to public transportation to offices. However, the cost of consuming electricity and the regular maintenance of air conditioner parts – especially its filters add up considerable cost for everyone, not to mention the indoor air pollution brought by air conditioners. We discovered SUNCOAT at MicroNano Tec Hall during the Hannover Messe and had the opportunity to interview its Director Mr Janos Brellos. Their product heatstop (see figure 1-A) caught our eyes.

SUNCOAT's heatstop is a 100-µm thick transparent self adhesive polyethyleneterephtalate (PET) foil with 12.5-µm thick transparent (transparency > 80%) nano coating which can reflect and absorb the sun's ray and keep out the heat. The temperature of sealed box using SUNCOAT heatstop on the front glass window remains at 27.3 °C while the adjacent box without SUNCOAT heatstop is heated to 43.7 °C by the same light source in several minutes (see figure 1-B). Nanoparticles dispersed in the substrate materials are smaller than the wavelength of the light and so it is invisible. The functional nanoparticle (~25 nm) coating is transparent and shows excellent infrared (IR) absorption. Compared with the similar products from 3M which reflect 50% of the sunlight, SUNCOAT heatstop can only reflect 20% of the sunlight. However, its superior IR absorption property allows it to absorb 29% of total light. As a result, the SUNCOAT heatstop is able to match the performance (UV and IR protection) of a 3M product but with 30% lower in price. In addition, it alsou has an additional advantage that the coating surfaces won't become wet by the condensation of water from the cooled air thanks to its IR absorption automatically warming up the coating surfaces. Self-adhesive SUNCOAT heatstop is easy to handle and has widely been used for the heat protection of greenhouses, sun parlors, glass facades and roofs in industrial buildings. In addition to the sales in Europe, this heatstop product has been applied to the roofs of industrial plants in Mexico and China for providing more comfortable working environments and saving energy as well as cost.

In addition to the IR-heat protection films, SUNCOAT also developed thermal heating foils and flexible thin film solar cells using their proprietary nano coating technology with its in-house thestate of the art coating facilities. Their heating foils can be warmed up to the temperature range from 36 to 70 °C when conduct electricity. The nanostructures in the heating foils lead to additional advantage of high electrical conductivity and thus low power consumption. The size

of heating foils hasa maximum width up to 1300 mm and can be applied at residence, bathroom & sanitary, automotive, camping, leisure and other industrial heating applications. Their flexible thin film solar cells (TFSC) has a conversion efficiency of 7~9 % while its price is only half of the crystalline solar cells.

The holding company of SUNCOAT is Energist Holding AG in Switzerland and it established SUNCOAT at Zittau in Germany to do R&D and mass production. SUNCOAT can be reached within one hour by car driving from Dresden or Praque. This location allows SUNCOAT to be close to their industry partners, which has been regarded as one of the most important factors for the commercialization of nano products. In addition, SUNCOAT works closely with big companies like EVONIK industries AG, the multinational specialty chemical manufacturer serving the automotive, plastics, pharmaceutical, and other industries, and progressive governments such as Abu Dhabi which is keen to develop their nanotechnology industry and has great interest in the clean technology. Like what Newton says, “if I have been able to see further, it was only because I stood on the shoulders of giants,” the partnership with big companies and government not only allows SUNCOAT to stay ahead on technology but also ensures the company revenue and opening up customer channels.

Figure 1. A) SUNCOAT heatstop (top) and thermal heating foils (down) were showcased at Hannover Messe; B) right box covered by SUNCOAT heatstop were always remaining at 27.3 °C while the left box without heatstop protection is heated to 43.7 °C in several minutes; C) Mr Brellos (SUNCOAT) was introducing the partners of SUNCOAT to Dr Lerwen Liu (NanoGlobe) during interview.