

SAIP 2011



Contribution ID : 33

Vanadium Dioxide Nanoplatelets Based nanocomposites for IR Solar Radiation Modulation

Thursday 14 Jul 2011 at 17:00 (02h00')

Content :

Examples of novel coating technologies towards Infrared solar radiation regulation/modulation in smart glass windows for the satellite sector include electrochromic and thermochromic based high vacuum manufactured dynamic coatings. The latter two technologies are solar radiations control oriented technologies in the visible and infrared radiation respectively. The thermochromic smart coated windows are infrared active and self regulating systems. Due to its natural phase transition around 68°C, vanadium dioxide coated systems exhibit an exceptional reversible and self induced optical modulation in the infrared solar spectrum. If the temperature of the vanadium dioxide coated on a glass window is smaller than 68°C, the smart window is transparent to the solar infrared radiations i.e. heat transmitting while it reflects the infrared radiations if its temperature is higher than 68°C i.e. heat opaque. To apply such a thermochromic smart material on a large scale in automotive and building sector, it is required to shift their transition temperature to about 25°C as well as innovating a physical-chemical process for production of large surface coatings. While the first requirement can be achieved by tungsten doping, the second could be reached by a hybrid polymer- VO₂ (M) nanoparticles based coatings. This contribution reports the physical and specifically the optical characteristics of VO₂ nanoplatelets/PVP nano-composites.

Level (Hons, MSc, PhD, other)? :

PHD

Consider for a student award (Yes / No)? :

yes

Short Paper :

yes

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Session classification : Poster2

Track classification : Track C - Lasers, Optics and Spectroscopy

Type : Poster Presentation