IR-reflective colored solar cells with transparent MgF_2/Al2O3/SiO_2/Al2O3/Ag/Al2O3 mltilayerthin films

Jang-Hsing Hsieh [1] and Yi-Jin Wei [1]

[1]Ming Chi University of Technology, Taiwan

Improvingthe aesthetic of solar cells would grant architects a huge potential for a perfect integration of solar panels into buildingfaçades: this can be achieved by coloured interference coatings on the solar cells. These coatings also open the possibility to matchthe colours of the solar cells to those of otherarchitectural components and design elements. An important boundary condition for

the coloured filter production is however, to provide a sufficientlyhigh solar transmittance.

This study focuses on the optical film design and the reflection of IR irradiation. To access more directly the correlation between solar transmittance, light spectra andvisual and energetic performance of the coatings, a thin-filmsimulation software has been used. Based onthe developed colour-filter designs, multilayer stacks weredeposited via sputtering deposition (IBAD). The deposited coatings exhibit asolar transmittance T>90% with 90% of the original efficiency. Most imporatntly, the temperature of the solar cell can stay at a temperature lower than 35 ^{o}C for long time.