

TiO₂/PDMS Coating With Minimum Solar Absorption Loss for Passive Daytime Radiative Cooling

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Abstract : We have designed a TiO₂/PDMS coating with 94% solar reflection, 96% IR emission, and 81.8 W/m² cooling power for passive daytime radiative cooling using Kubelka Munk theory and CST microwave studio. To reduce solar absorption loss in 0.3-0.39 μ m wavelength region, a TiO₂ thin film on top of the coating is used. Simulation using Ansys Lumerical shows that for a 20 nm thick TiO₂/PDMS coating, a TiO₂ thin film of 84 nm increases the coating's reflectivity by 11% in the solar region.

Keywords : passive daytime radiative cooling, disordered metamaterial, Kubelka Munk theory, solar reflectivity

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