Wavelength-Selective Thermal Emitter with Polymeric Bilayer for Radiative Cooling

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A bunch of issues on a reduction of electricity consumption has been discussed for recent years. A development of passive device without electricity is necessary to resolve the problem. To response the demands, diverse green energies not to consume the electricity has been developed such as radiative cooling. In this research, we demonstrate a passive device that works as a wavelength-selective thermal emitter for radiative cooling. The suggested thermal emitter consists of polymer-polymer bilayer as selective thermal emitter and aluminium (Al) as a broadband solar reflector. Transparent polymers such as PDMS, PET are transparent in visible region (0.4-0.8 μm), while emissive in middle infrared region (2.0-20.0 μm) due to different n,k value. With aforementioned optical properties of transparent polymer, we determined the optimized bilayer coating thickness for the wavelength-selective thermal emitter the mid-IR region.