

ABSTRACT

The present disclosure provides a composite radiative cooling film including a top layer and a reflective layer disposed below the top layer. A material of the top layer includes at least one polymer having an emissivity greater than or equal to 80% in a wavelength range of 7 μm to 14 μm . The top layer includes a first emissive layer adjacent to the reflective layer and a second emissive layer away from the reflective layer. A material of the first emissive layer includes a first polymer. The first emissive layer further includes a plurality of first pores. The plurality of first pores are distributed in the first emissive layer. A material of the second emissive layer includes a second polymer and the second emissive layer further includes a plurality of second pores. The plurality of second pores are distributed in the second emissive layer. A pore size of the plurality of first pores is in a range of 1 μm to 20 μm and a pore size of the plurality of second pores is in a range of 1 nm to 200 nm. The present disclosure further provides a composite film assembly including the composite radiative cooling film and application thereof. In the present disclosure, the emissivity of the top layer in a wavelength range of 7 μm - 14 μm can be greatly improved via a combination of the plurality of first pores and the plurality of second pores, such that the radiative cooling effect of the composite radiative cooling film can be improved.

Figure 4