

(12) PATENT APPLICATION PUBLICATION

(21) Application No.202311056224 A

(19) INDIA

(22) Date of filing of Application :22/08/2023

(43) Publication Date : 22/09/2023

(54) Title of the invention : METAMATERIALS-ENHANCED PASSIVE RADIATIVE COOLING PANEL

(51) International classification :G02B0001000000, F28F0013180000, B82Y0020000000, G02B0006122000, B32B0027400000
(86) International Application No :NA
Filing Date :NA
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
Filing Date :NA
(62) Divisional to Application Number :NA
Filing Date :NA

(71)Name of Applicant :

1)Chitkara University

Address of Applicant :Chitkara University, Chandigarh-Patiala National Highway, Village Jhansla, Rajpura, Punjab - 140401, India. Patiala -----

2)Bluest Mettle Solutions Private Limited

Name of Applicant : NA

Address of Applicant : NA

(72)Name of Inventor :

1)MISHRA, Rahul

Address of Applicant :ODC-4, Panchshil Tech Park, inside Courtyard by Marriott premises, Hinjewadi Phase - 1, Pune - 411057, Maharashtra, India Pune -----

2)PANDEY, Sakshi

Address of Applicant :ODC-4, Panchshil Tech Park, inside Courtyard by Marriott premises, Hinjewadi Phase - 1, Pune - 411057, Maharashtra, India. Pune -----

3)MANTRI, Archana

Address of Applicant :Chitkara University, Chandigarh-Patiala National Highway, Village Jhansla, Rajpura, Punjab - 140401, India. Patiala -----

(57) Abstract :

A metamaterial passive radiative cooling panel (100) to achieve enhanced cooling efficiency is disclosed. The panel (100) includes a base material (102) made of a group of metals, ceramics, and polymers, providing essential mechanical support, thermal conductivity, and durability. Additionally, a layer (104) of metamaterial is fabricated on top of the base material, which can be fabricated using various techniques such as lithography, printing, and deposition. The metamaterial layer is selected from a group of photonic crystals, plasmonic materials, and hyperbolic materials, exhibiting a high emissivity at long wavelengths, thereby promoting effective heat dissipation. To further optimize cooling performance, the thickness of the metamaterial layer can be tailored accordingly. The metamaterial passive radiative cooling panel (100) used in energy-efficient buildings, solar panels, and electronic devices, offering a promising solution for passive cooling with a broad range of potential uses.

No. of Pages : 16 No. of Claims : 8