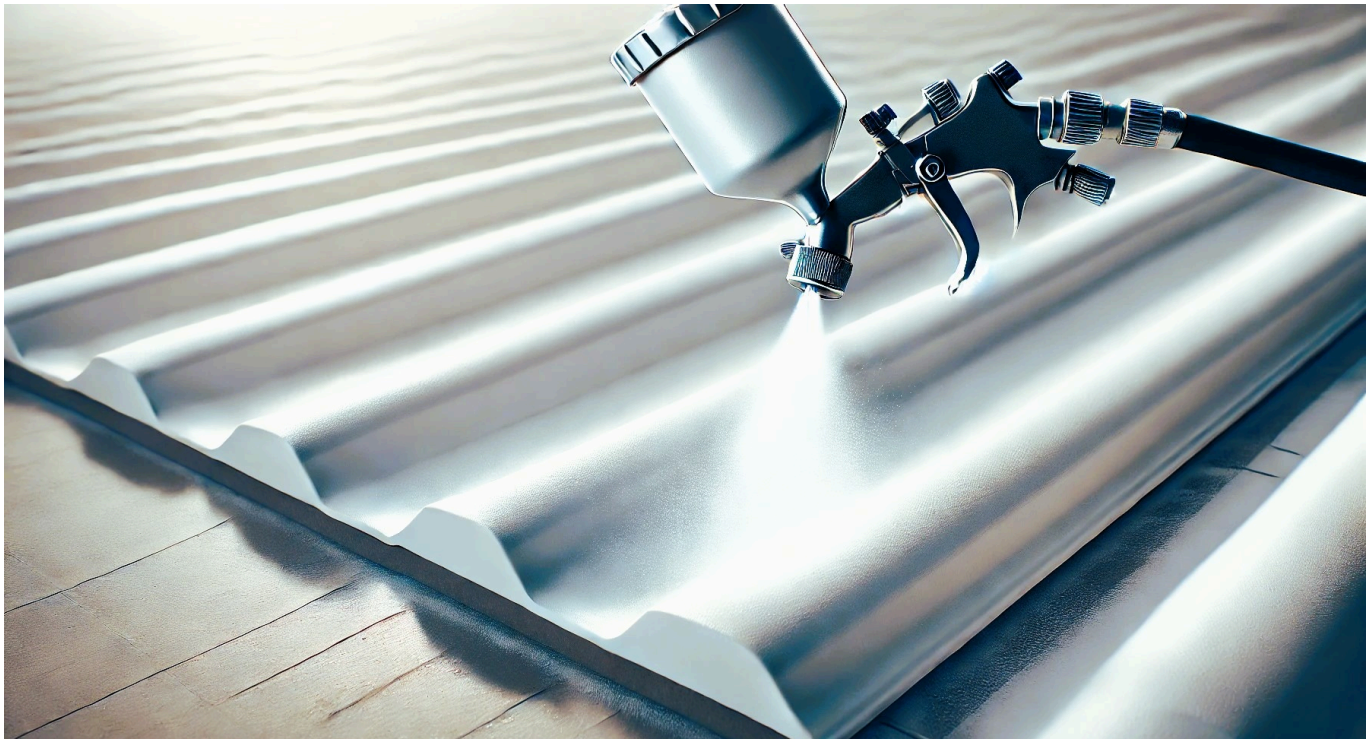
TECH OFFER

Cost-Effective Spray Coating for Passive Radiative Cooling in Buildings



KEY INFORMATION

TECHNOLOGY CATEGORY:
Chemicals - Coatings & Paints
Green Building - Heating, Ventilation & Air-conditioning
Materials - Composites

TECHNOLOGY READINESS LEVEL (TRL): TRL6
COUNTRY: THAILAND
ID NUMBER: TO175271

OVERVIEW

Rising global temperatures have increased energy demands for cooling, driving up greenhouse gas emissions and worsening climate change. To address these issues, radiative cooling offers a passive, energy-efficient solution by emitting heat through infrared radiation in the 8–13 µm range, where minimal atmospheric absorption occurs, allowing heat to escape into space. This can significantly reduce energy consumption while providing a sustainable cooling.

The technology owner has developed an innovative droplet-shaped coating specifically designed for building roofs and construction materials. This cutting-edge coating efficiently dissipates heat through radiation, lowering surface temperatures by 1-3°C and reducing electricity consumption by 5-15%. Crafted from a clear polymer and applied through a cost-effective spraying process, this cooling coating preserves the original colour of the substrate. It offers a powerful solution to combat rising temperatures and reduce the carbon footprint, making it ideal for homeowners, construction material manufacturers, and businesses seeking to lower energy consumption and operating costs without compromising the visual appeal of their properties.

The technology owner is interested in R&D collaboration and test-bedding with building materials manufacturers, property developers, and construction companies. The technology is also available for out-licensing to paint developers and manufactures.

TECHNOLOGY FEATURES & SPECIFICATIONS

- **Droplet-like Structures:** Induce Mie scattering, enhancing emissivity in the 8-13 µm range, allowing efficient heat dissipation through the atmosphere into outer space
- **Non-toxic Formulation:** Made from a clear, silicone-based elastomer that is safe for environments
- **Radiative Cooling:** Achieve temperature reduction of up to 3.94°C, particularly effective in tropical climates
- **Transparency:** Maintains the original colour and aesthetic appeal of the substrate
- **Versatile Application:** Can be applied on various surfaces, including glass, wood, metal sheets, and roof tiles
- **Low-Cost and Scalable:** Offers an affordable, scalable solution with easy spray-coating application using a commercial spray gun

POTENTIAL APPLICATIONS

Potential applications of this cooling technology include, but are not limited to:

- **Building Applications:** Ideal for rooftops, exterior walls, and façades to improve cooling efficiency
- **Automotive:** Can be applied to car exteriors to reduce heat buildup
- **Facilities in Hot Climates:** Suitable for transportation, storage systems, and other outdoor infrastructures

UNIQUE VALUE PROPOSITION

- Droplet-like infrared hot spots induce Mie scattering, enhancing emissivity
- Cost-effective solution through scalable spray-coating method
- Suitable for a wide range of materials and surfaces
- Effective in tropical climates with high solar irradiance and humidity