

**TECH OFFER**

## Multifunctional Multilayer Coating for Building and Photovoltaic (PV) Application



### KEY INFORMATION

TECHNOLOGY CATEGORY:  
Chemicals - Coatings & Paints  
Energy - Solar

TECHNOLOGY READINESS LEVEL (TRL): **TRL5**  
COUNTRY: **SINGAPORE**  
ID NUMBER: **TO175402**

### OVERVIEW

Buildings and photovoltaic (PV) systems face two major challenges: excessive heat gain and frequent surface soiling. In tropical climates, solar heat through glass façades can account for up to 40% of total cooling demand, while dust accumulation on PV panels can lower efficiency by 5–30% within months. These issues increase energy use, maintenance frequency, and operational costs.

This technology introduces a multifunctional multilayer coating that integrates self-cleaning, infrared (IR) heat rejection, and high optical transparency in a single, durable formulation. Unlike conventional coatings that require multiple layers for different functions, this innovation achieves comparable or superior performance in an integrated multilayer design—simplifying application and lowering cost. The photocatalytic self-cleaning surface decomposes organic contaminants and enables natural washing by rain, reducing cleaning needs. Simultaneously, the IR-reflective layer rejects near-infrared heat while maintaining over **~80% visible light** transmittance, cutting cooling energy use by **~10–15%** without compromising daylight. Compact, scalable, and retrofit-friendly, this coating offers a cost-effective solution for building operators and solar installers aiming to enhance energy

efficiency, reduce maintenance, and improve sustainability performance.

The technology owner is seeking industry partners in solar panel manufacturing, green building projects, and glass applications for licensing

## TECHNOLOGY FEATURES & SPECIFICATIONS

- **Advanced Sputtering Process:** Enables uniform multilayer deposition with high scratch resistance, strong adhesion, and optimized refractive index for superior optical clarity.
- **High Transparency with Heat Rejection:** Maintains ~80% visible light transmittance while blocking infrared radiation (700–2500 nm) to reduce solar heat gain.
- **Thermal Regulation:** Proven to lower surface and indoor temperatures in both PV applications and buildings respectively.
- **Multifunctional Design:** Integrates self-cleaning, heat reflection, and high transparency into a single coating layer, simplifying fabrication and application.
- **Self-Cleaning Surface:** Photocatalytic-hydrophilic layer breaks down contaminants and allows natural rinsing by rain, reducing cleaning frequency.
- **Cost-Competitive Solution:** Offers multi-functional performance at comparable cost to conventional single-function coatings, suitable for solar panels, façades, and glass applications.

## POTENTIAL APPLICATIONS

- Commercial and Residential Glazing Systems
- Solar Panel Installations
- Green Building and Retrofitting Projects
- Automotive Glass Applications
- Smart Windows and Energy-Efficient Architecture

## UNIQUE VALUE PROPOSITION

- **Single Multifunctional Coating:** Integrates self-cleaning, heat reflection, and high transparency in an integrated multilayer design, eliminating the need for multiple single-function coatings.
- **Energy Efficiency:** Reduces building cooling energy consumption while maintaining high natural light transmission for occupant comfort and daylighting.
- **Low Maintenance:** Decreases cleaning frequency and maintenance costs through its self-cleaning, photocatalytic surface.

- **Urban Heat Mitigation:** Contributes to reducing the urban heat island effect by reflecting rather than absorbing solar radiation.