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Showcasing research from Prof. Ko's laboratory, Seoul National University, Korea and Prof. Chen's laboratory, Massachusetts Institute of Technology, Cambridge, United States.

Towards decarbonization in transportation: scalable transparent radiative cooling for enhanced vehicle energy efficiency

Vehicles exposed to sunlight heat up rapidly, increasing HVAC energy use. Transparent radiative cooling (TRC) offers passive heat mitigation, but prior approaches lacked optical clarity, durability, and real-world validation. We developed a scalable transparent radiative cooling (STRC) film for vehicle windows with >70% visible transmittance, strong mid-infrared emission, and high solar reflectance. Full-scale tests across regions and vehicle types showed up to 6.1 °C cabin temperature reduction and over 20% energy savings, with minimal winter penalty. U.S. fleet modelling projects 25.4 Mt annual CO₂ reduction.

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