Ultrahigh Solar Reflectivity Based On Yttrium Oxide (Y2o3) Hollow Microspheres

Tech ID: 34349 / UC Case 2023-737-0

BRIEF DESCRIPTION

An innovative advanced material coating with superior cooling performance across all wavelengths that is crucial for energy consumption and heat management applications.

FULL DESCRIPTION

This novel technology reduces surface temperature significantly and provides exceptional cooling power without relying on expensive metallic reflectors or complex fabrication processes. The polymer composite coating utilizes a carbon microsphere templated hydrothermal approach to fabricate yttrium oxide (Y2O3) hollow microspheres. The Y2O3 microsphere coatings have near-unity solar reflectivity and high infrared emissivity, far outperforming traditional hollow glass microspheres (SiO2) across ultraviolet, visible, and near-infrared wavelengths.

SUGGESTED USES

- Passive radiative cooling coatings for outdoor equipment and vehicles.
- Polymer composite materials for temperature regulation.
- Renewable energy systems requiring thermal management.
- Consumer products seeking reduced energy consumption and heat management.

ADVANTAGES

- High solar reflectivity and infrared emissivity (>0.9) for effective cooling.
- Simple and cost-effective fabrication via carbon microsphere templated hydrothermal method.
- Superior performance compared to hollow glass microspheres.
- Low coating thickness required for optimal performance.
- Eliminates need for expensive metallic reflectors and complex manufacturing.

PATENT STATUS

Patent Pending

RELATED MATERIALS

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OTHER INFORMATION

CATEGORIZED AS

- **Materials & Chemicals**
  - Chemicals
  - Polymers
  - Thin Films
- **Nanotechnology**
  - Materials

RELATED CASES

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» Nie, Xiao, 2022. Optical and Thermal Properties of Cool White Coatings based on Ceramic Hollow Microspheres. UC Irvine Electronic Theses and Dissertations.

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