

Energy-Saving Insulation with Adjustable Thermal Properties

ID: 2024-007

Executive Statement:

An innovative insulation technology that adjusts its thermal properties to reduce building energy consumption significantly.

Description:

This technology introduces a low-cost, high-volume manufacturing method for producing switchable thermal metamaterials. Utilizing origami-inspired structures, it can change its thermal conductivity based on configuration, offering a dynamic approach to building insulation that leverages natural temperature gradients and renewable materials to enhance energy efficiency.

Key Advantages:

- Cost-effective continuous manufacturing process.
- Ability to switch between high thermal conductivity and high insulative properties.
- Compatibility with phase change materials for enhanced energy efficiency.
- Use of renewable materials, contributing to sustainability.
- Innovative use of origami structures for flexible thermal solutions.

Problems Solved:

- High energy consumption in buildings for heating and cooling.
- Lack of dynamic insulation solutions in the market.
- Cost and environmental impact of traditional insulation materials.

Market Applications:

- Residential and commercial building insulation.
- Energy-efficient architectural designs.
- Sustainable construction projects.
- Integration with smart building technologies for adaptive climate control.