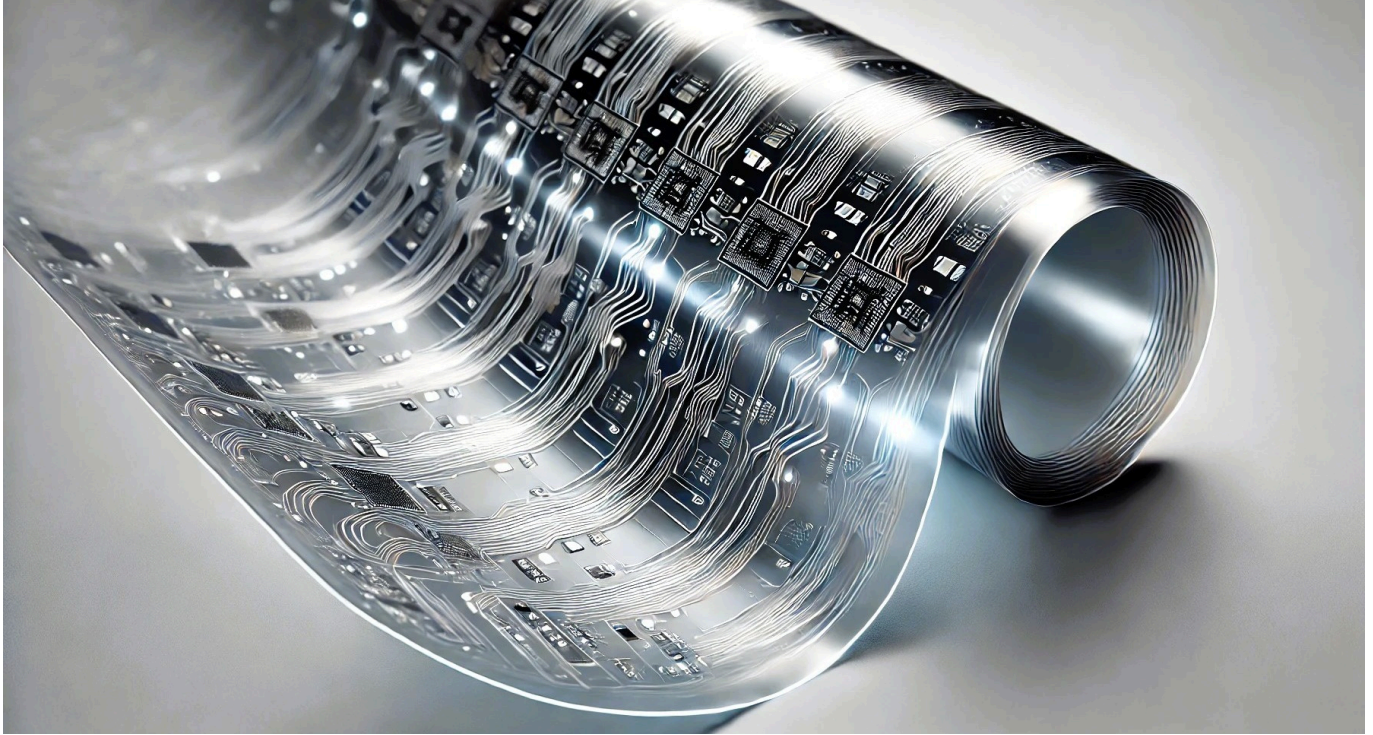


**TECH OFFER**

**Flexible and Intelligent Flame-Retardant Electrothermal Film**



**KEY INFORMATION**

TECHNOLOGY CATEGORY:

Materials - Composites

Electronics - Power Management

Infocomm - Internet of Things

TECHNOLOGY READINESS LEVEL (TRL): **TRL4**

COUNTRY: **CHINA**

ID NUMBER: **TO175206**

**OVERVIEW**

The global heating industry is undergoing significant transformation as the demand for energy-efficient and eco-friendly solutions increases. Traditional wire heating systems are inefficient with limitations such as uneven heat distribution, high power consumption, and restricted flexibility and high carbon emission. These challenges necessitate the development of advanced heating materials that can offer higher efficiency, lower energy consumption, greater flexibility, and adaptability to various applications.

In response, the technology owner has developed an innovative flexible intelligent electrothermal film made from carbon fibers, representing a novel electrothermal conversion material. Through independent research and development (R&D) in large-scale preparation and modification, this technology has achieved low-voltage and high-efficiency energy conversion. By incorporating intelligent power management, this electrothermal film overcomes many limitations of traditional resistance wire heating and offers unique surface radiation benefits, delivering more than 30% energy savings. Its scalable production and unique

performance advantages position it as a key technology to address the heating needs of the future.

The technology owner has expertise and large-scale production capabilities and is actively seeking R&D collaboration opportunities with industrial partners to explore potential applications.

## TECHNOLOGY FEATURES & SPECIFICATIONS

Compared to traditional electric heating, it offers the following key features:

- **Uniform Surface Heating:** Maintains a temperature difference of only +/- 2°C for consistent performance
- **Rapid Temperature Rise:** Capable of reaching 300°C within seconds, reducing preheating time by two-thirds
- **High Electrothermal Conversion Efficiency (up to 99%):** Achieves over 40% power savings compared to resistance wire heating coils, significantly conserving electricity.
- **Sensorless Intelligent Temperature Control:** Allows for precise temperature regulation of the heated object
- **Ultra-thin and Ultra-light:** Thickness ranges from 30 to 200µm and the density is 1/12 of copper
- **Safe and Reliable Design:** Features a flame-retardant and heat-resistant construction with no open flames

## POTENTIAL APPLICATIONS

This technology is designed for innovative products in areas such as new energy vehicles, smart furniture, industrial energy conservation, physiotherapy, and military applications. Potential applications include, but are not limited to:

- Anti-icing systems for wind turbine blades
- Smart thermal insulation jackets for Li-ion batteries in electric vehicles (EV)
- Electric heating elements for cold start of LED screens
- Rapid electric heating for smart temperature-controlled alloy panels
- Constant temperature control for cultivation of agricultural seedlings for breeding purposes

## UNIQUE VALUE PROPOSITION

- **Revolutionary Electrothermal Conversion Material:** Offers high thermal efficiency and significant energy savings
- **Intelligent Self-Temperature Control:** Provides precise heat regulation without the need for additional sensors
- **Lightweight and Compact Design:** Applicable for a wide range of applications across various sectors
- **High Safety and Reliability:** Lasts up to 10 times longer than conventional films due to enhanced resistance to deformation, ensuring long-time safety with no open flames