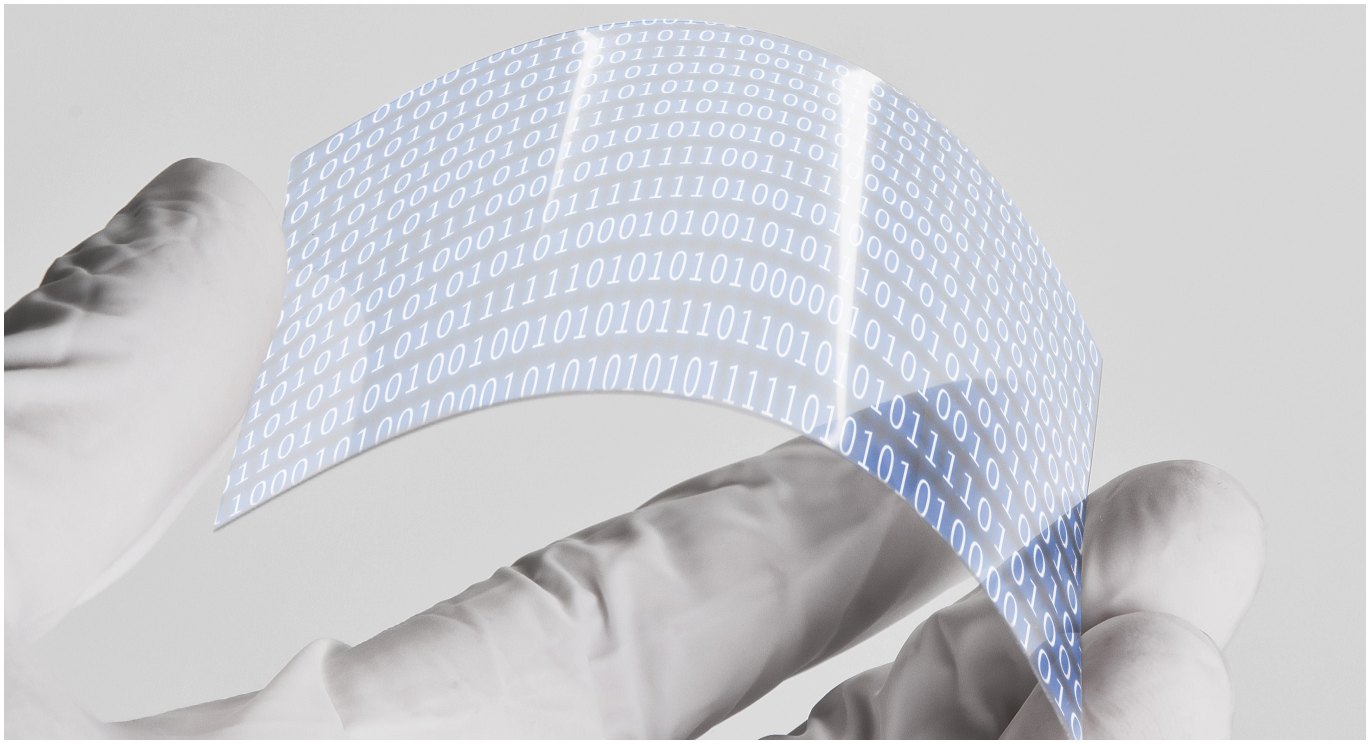
TECH OFFER

Unique Double-Sided Metal Mesh-Based Transparent Conductive Film



KEY INFORMATION

TECHNOLOGY CATEGORY:
Electronics - Display
Electronics - Radio Frequency
Energy - Solar
Infocomm - Mobility
Sustainability - Low Carbon Economy

TECHNOLOGY READINESS LEVEL (TRL): TRL9
COUNTRY: SINGAPORE
ID NUMBER: TO174788

OVERVIEW

Transparent conductive films have the function of transmitting both electricity and visible light. Indium tin oxide (ITO) has been widely used as a transparent electrode, but it is not able to meet the demand for lower resistance required in recent years. Metal mesh has been developed as an alternative, but there is a trade-off between lower resistance and finer wiring lines. When a large size is required, transmissivity has to be sacrificed by the increased line width to lower the resistance.

The technology owner has developed a double-sided metal mesh-based transparent conductive film using a unique roll-to-roll manufacturing process to achieve a high wiring aspect ratio, low electrical resistance, and high transmissivity at the same time. It also has a very high planarity of the film surface, ensuring stable performance and quality when used as a transparent electrode for thin film applications.

TECHNOLOGY FEATURES & SPECIFICATIONS

This technology is a unique manufacturing process for making metal mesh-based transparent conductive films with high light transmissivity and low electrical resistance. The technical features and specifications are listed as follows:

- Super-fine line width of 2 µm or less
- Low sheet resistance of 2 Ω or less (when transmissivity is 89%)
- Unique wire forming method (embedded in substrate film)
- High aspect ratio wiring to achieve low resistance maintaining high transmissivity
- Various base film materials (Polyethylene terephthalate (PET), polycarbonates (PC), cyclic olefin polymer (COP))
- Single side and double side patterning available
- Supply form: roll form and sheet form available (max size 580 x 700 mm)

POTENTIAL APPLICATIONS

Transparent conductive films have a wide range of potential applications in various industries, where the combination of transparency and conductivity is required. The potential applications include but are not limited to:

- Transparent touch sensor for electronics, automotive and medical devices
- Transparent display for AR headsets, smart glasses, and digital signage
- Transparent heater for sensing camera, LiDAR, and surveillance camera
- High frequency tele-communication:
    - Transparent antenna for 5G/6G communication
    - Meta-surface radio wave reflector
- Transparent electrodes:
    - Flexible photovoltaics (PV) solar cell
    - Light control panel and window
- Transparent electromagnetic interference (EMI) shield
- Transparent biochip for in-vitro diagnostic and monitoring

UNIQUE VALUE PROPOSITION

- Combine low electrical resistance and high light transmissivity
- Unique wire forming method and roll-to-roll manufacturing process
- Wide choices of base film materials (PET, PC, COP)
- Adaptable to various applications: touch screen, large-size and flexible display, defogging heater, high frequency tele-communication, high efficiency solar cell, quick response light control panel, etc.

The technology owner is keen on R&D collaborations with partners who are interested in adopting the transparent conductive film in their products and applications.