CHASM AgeNT®-1-G2

Hybrid Transparent Conductive Films

PRODUCT DESCRIPTION

AgeNT-1-G2 is a Nanotube Hybrid Transparent Conductive Film (TCF) made by printing proprietary AgeNT ink formulated with conductive carbon nanotubes onto a Metal Mesh (MM) film. Delivering comparatively more robust and uniform conductivity at higher transparency, this exclusive category of flexible TCF performs substantially better than TCFs comprised of CNTs or MM alone.

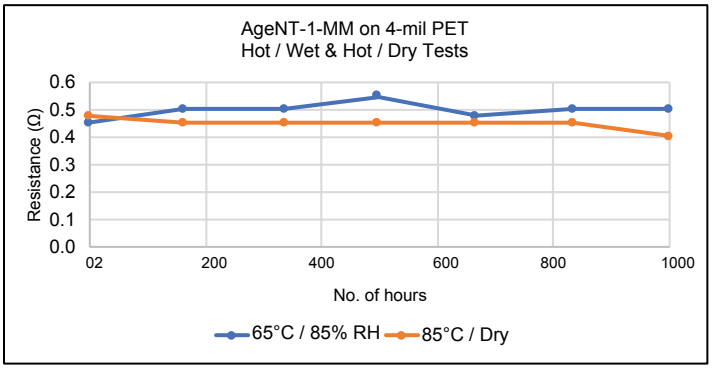
HOW AGENT® WORKS

Nanotube ink is formulated for screen printing and is comprised of a mixture of our single-walled nanotubes (CoMoCAT™ technology), an optically clear polymer binder and our proprietary ink vehicle (V2V™ technology). The grade of Nanotube Hybrid ink that is used for making AgeNT-1 product structures is CHASM AGENT-VC201.

The MM film is comprised of a copper (Cu) mesh in a diamond-shape patterned onto 100µm thick PET film. Thickness of the Cu is 2µm with a line width and pitch of 5µm & 300µm respectively. The grade of MM film used for making AgeNT-1 G2 product structures is CHASM AgeNT-AM210.

AgeNT-1-G2 film is available in standard sheet size of approximately 457mm X 605mm. Alternative sheet sizes as large as 605mm X 1,030mm. Available from CHASM, selected subcontractors, and partners. Please note minimum trace width is 3mm and minimum gap width is 0.2mm.

ENVIRONMENTAL



Resistance, adhesion and optical properties exhibit very stable behavior with environmental aging.

OPTOELECTRONIC PROPERTIES

	TCF + Substrate	TCF only
Sheet Resistance (Ω/☐)	1	1
VLT (%)	88%	95%
Haze (%)	2.34%	0.79%
L*	94.08	-
a*	-0.04	-
b*	0.75	-

Optical properties measured by R-chek 4-point resistance meter, BYK Hazegard transparency meter or X-Rite spectrophotometer.

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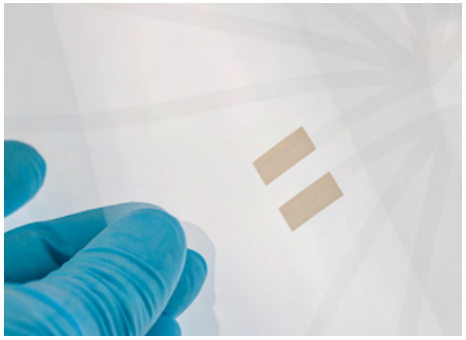
CHASM AgeNT®-1-G2

Hybrid Transparent Conductive Films

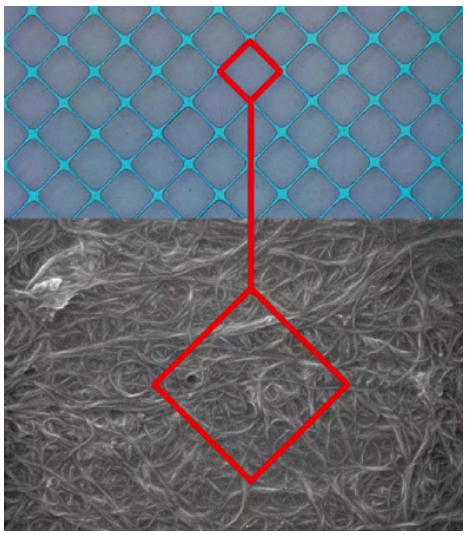
AgeNT-1-G2 STACK

PE Release Liner
VC201 Ink plus 1Ω/☐ Cu MM
4 mil PET Film
PE Release Liner

AM210



AgeNT-1 Film: Diamond pattern consists of 5µm lines of 2µm thick Cu having a 300µm pitch for ~ 96% open area



Nanotubes bridge across open areas making them conductive.

PRODUCT BENEFITS

- Extremely low sheet resistance with high optical transparency
- Low materials and processing costs for creating patterned TCFs
- Thin & flexible – can be easily be attached to flat or curved plastic or glass surfaces with OCA film
- Resistance, adhesion and optical properties are very stable with environmental aging.

TARGET APPLICATIONS

Applications include transparent RF antennas, transparent heaters, transparent RF / EMI shielding, transparent wiring for micro-LEDs, etc.

- Transparent RF Antennas
- Transparent EMI/RF Shielding
- Transparent Heaters
- Transparent Electrodes for Lighting

SUPPORTING DATA

Flexible printed circuit (FPC) patterns are created by:

1. screen printing CNT ink on top of the MM film;
2. hot air drying at ~ 100°C;
3. chemically etching the exposed Cu mesh areas.

Typical etchants include Ferric Chloride (industry standard for Cu etching) or Ferric Nitrate.

This affordable circuit patterning process is suitable for mass production and is referred to as “Print / Etch / Done”. Having fewer processing steps and creating less waste streams than photolithographic etching or laser ablation, “Print / Etch / Done” is faster and more cost effective.

AgeNT ink is a multi-functional material acting as both a printed etch mask for low-cost patterning and also as an encapsulate of the MM delivering superior environmental stability. TCFs created from CHASM Nanotube Hybrids are more robust and uniformly conductive for the best printed electronics you’ll never see.

AgeNT-1-G2: 1Ω/☐ at >94% VLT