Applied Nanotech, Inc.
a PEN Inc company

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Cu-PM530

Micro Copper Paste

ANI's Cu-PM530 is a screen-printable copper paste for creating conductive patterns for applications in the printed electronics industry. Cu-PM530 is the cost effective alternative to conductive silver pastes. Cu-PM530 paste works on multiple substrates including FR4 epoxy based PCB, PET, ABS, COP and paper.

Conductivity is achieved using a photosintering process employing a high intensity light pulse for ~2ms at ambient atmosphere. This allows quick processing time compared to traditional oven-based thermal sintering methods.

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Typical properties

Part Number	**Cu-PM530**
Sheet resistance	**0.15 Ω/sq***
Resistivity	**50 µΩ -cm**
Solids Content	**50% by weight**
Viscosity	**50,000-70,000 cP****
Dried thickness	**3-4 µm ***
Fired thickness	**3 µm**
Adhesion	**5B****

* Sheet resistance is function of sintering conditions
** Measured at 10rpm and 25°C with Brookfield DV-E concentric cylinder viscometer. Can be tuned to specific customer requirements
*** Depends on screen printer setup
**** Adhesion measured using ASTM 3359D Method

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Application Notes:
Cu-PM530 Micro Copper Paste

Description
ANI Cu-PM530 micro copper paste is formulated for screen printing techniques. The Cu-PM530 paste is designed for flexible substrates commonly used in printed electronics. Examples substrates include PET, Paper, Polycarbonate, ABS and FR4 composite materials. The micro copper paste provides excellent electrical properties and is an excellent replacement for silver based conductors.

Storage and Shelf Life
Cu-PM530 copper paste should be stored in a tightly sealed leak proof container in a cool dry place. Settling may occur during storage.

Safety and Handling
When working with Cu-PM530 micro copper paste, use adequate ventilation and wear appropriate protective wear. Cu-PM530 can cause eye and skin irritation. The following precautions should be taken when handling Cu-PM530 paste:

- Read the Material Safety Data Sheet (MSDS)
- Avoid prolonged breathing of vapor
- Use appropriate safety equipment such as gloves and eye protection
- Wash hands thoroughly after handling
- Keep the ink container closed when not in use to prevent drying and spilling

Processing Procedures

Pre-processing

- Equilibrate to room temperature.
- A mixing process is recommended to obtain homogeneous paste before use.

Printing

- Printing can be done using a screen print or wire rod coating process.
- Recommended screen print parameters:
  - Screen Mesh – 250-325
  - Emulsion thickness – 12 micron (0.5mil)
  - Contact Force ~15 kg
  - Print speed ~100 mm/s
  - 60 deg trailing edge
  - 70-75A Durometer polyurethane squeegee
- Recommend wire rod #10

Drying

- Printed paste can be dried at 100°C for 30 minutes in ambient atmosphere.

Sintering

- Low-temperature sintering: printed paste on polymeric substrates can be photosintered using a xenon arc-discharge lamp system (Xenon 2000). The sintering parameters are 2msec single-pulse, 2.6kV, and the distance from lamp to sample is 2.5cm. Conditions will vary based on substrate.
- High-temperature sintering: printed paste can be sintered at 450°C in forming gas. Conditions will vary based on substrate.

Electroplating

- After sintering, Cu-PM530 can be electroplated using standard processes.

Clean-up

- Follow appropriate cleaning procedures for equipment used to print Cu-PM530 paste. Excess paste can be removed with ethanol, IPA, or acetone.

Photonic Sintering - Conductive Copper Ink

Putting you in Charge

XENON's high energy S-2100 Pulsed Light system has been proven to rapidly sinter ***Applied Nanotech, Inc.*** copper nanoparticle ink for applications in the printable electronics and PCB applications.

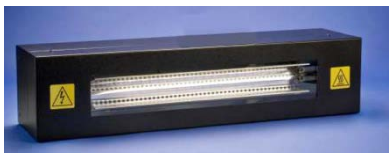
Key Specifications – Model S-2100

- Max radiant pulse energy 11 J/cm^2 at wavelengths of 190 nm to 1100 nm
- Delivers high average pulse power up to 3.7 kW/cm^2
- Ease of programming pulse energy, duration and sequencing using operator controller mounted in the systems electronics rack.
- Programmable pulse duration from 100 to 3000 μs
- Programmable pulse energy from 100 to 3,000 Joules
- Detached robust, air cooled lamp housings containing lamp, reflector and air filters.
- Storage and recall of all pulse settings with timing enables quick return to pulse recipes developed by operator.

XENON's S-2100 Pulsed Light sintering system provides the researcher the flexibility to easily program energy delivered to a target. Selecting from available lamp housings, such as the linear lamp model LH-840, (top photo below) or the spiral lamp model LH-910, (bottom photo below) provide unique exposure areas and energy profiles.

Enabling your success in printed electronics

The S-2100 is designed to support both research and low volume manufacturing for sintering of silver nanoparticle inks on low temperature substrates such as PET. This system is offered with a range of options which allow you to tailor the system to your specific sintering application.



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