



Applied Nanotech, Inc.

A PEN Inc company

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CuNi-IJ5050

Copper-Nickel Alloy Ink

ANI's CuNi-IJ5050 is a CuNi alloy (50/50) ink suitable for printing lines and patterns useful for printed resistors, strain gauges, thermopiles and thermocouple applications. CuNi-IJ5050 can be printed and cured to form conductive patterns on substrates such as silicon, ceramics and Kapton. The CuNi-IJ5050 contains copper-nickel alloy nanoparticles ranging in size from 20-40nm. CuNi-IJ5050 is solvent-based and can be printed by inkjet printing and aerosol jet printing techniques. Printed copper-nickel alloy ink on plastic substrates can be photosintered in atmosphere to produce conductive copper-nickel alloy traces.

Typical properties

Part number	CuNi-IJ5050
Particle Size	20-40 nm
Resistivity	200-300 mΩ/sq for 2µm film
Solid Content	30 wt%*
Viscosity	8-18 cP**
Surface Tension	26-31 mN/m
Solvent	Organic

* Available from 10-50 wt%

** Measured at 10rpm and 25C with Brookfield LV-I+ viscometer



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Application Notes

CuNi-IJ5050 Copper-Nickel Alloy Ink

Description

ANI's CuNi-IJ5050 is a copper-nickel alloy ink suitable for printing lines and patterns useful for printed resistors, strain gauges, thermopiles and thermocouple applications. CuNi-IJ5050 can be printed and sintered to form conductive patterns on substrates such as silicon and polyimide. CuNi-IJ5050 can be printed by inkjet and aerosolized jet platforms.

Storage and Shelf Life

CuNi-IJ5050 ink should be stored in a tightly sealed, leak-proof container at 3-10°C. Storage in freezers is not recommended. CuNi-IJ5050 can be stored up to 3 months.

Safety and Handling

When working with CuNi-IJ5050 ink, use adequate ventilation and wear appropriate protective gear. CuNi-IJ5050 can cause eye and skin irritation. The following precautions should be taken when handling CuNi-IJ5050 ink:

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

Processing Procedures

Pre-processing

- Soft-settling is expected with CuNi-IJ5050 ink. The CuNi-IJ5050 ink requires manual agitation (mix or stir) followed by sonication for 15 minutes.
- After sonication, the ink should be filtered using a 1 micrometer pore size glass fiber filter (PALL Acrodisc® 25mm 4523-T recommended).

Printing

- Printing has been demonstrated using inkjet, aerosolized jet, and wire rod draw-down. Conditions will vary based on technique and substrate.

Drying

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

Sintering

- CuNi-IJ5050 ink <5µM thickness printed onto flexible substrate materials can be photosintered using a xenon arc-discharge lamp system (Xenon 2000). The sintering parameters are 2msec single-pulse 2.0kV – 2.2kV; distance from lamp to sample is 3cm. Conditions will vary based on substrate.
- CuNi-IJ5050 ink can be thermal sintered at temperatures >350°C in a reducing atmosphere (H₂ = 4% in N₂) for 20 minutes.

Clean-up

- Follow appropriate cleaning procedures for equipment used to dispense CuNi-IJ5050 ink. Excess ink can be removed with ethanol, IPA, or acetone.

DISCLAIMER: Applied Nanotech, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy of this information for this product for any use or for any consequence of its use. Users assume all risk of handling, whether or not in accordance with any statements or recommendation of Applied Nanotech, Inc.

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/cm² at wavelengths of 190 nm to 1100 nm
- Delivers high average pulse power up to 3.7 kW/cm²
- Ease of programming pulse energy, duration and sequencing using operator controller mounted in the systems electronics rack.
- Programmable pulse duration from 100 to 3000 μ s
- 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.

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.



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.

