Compostable RFID antennas by leveraging nano-copper inks

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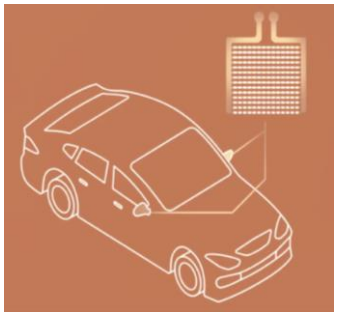
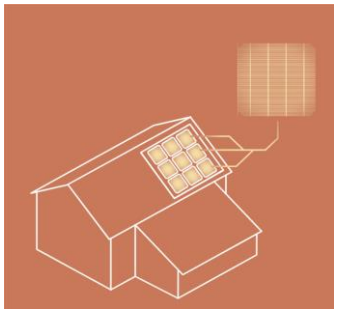
The Future of Printed Electronics is Copper.

We enable very-low cost, high conductivity, sustainable printed electronics.

Three key segments:

Printed RFID antennas; Flexible electronics ; Photovoltaics





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Copprint Strategic Investors

Henkel

hp

Copprint Awards

LOPEC
DRIVING THE FUTURE OF PRINTED ELECTRONICS

Printed Electronics EUROPE

Let’s start with a short video

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https://youtu.be/5S8alzIz4b0

The Need:
Conductive Patterns

Subtractive Manufacturing

Copper/aluminum Etching
Aluminum Die Cutting
Material Waste / Hazardous / Limited Substrates

Additive Manufacturing (Printing)

Silver Inks (~$3B Mkt) Expensive / Hazardous
Copper ink attempts - Failed Productization
Copprint Nano-Copper Ink NEW!

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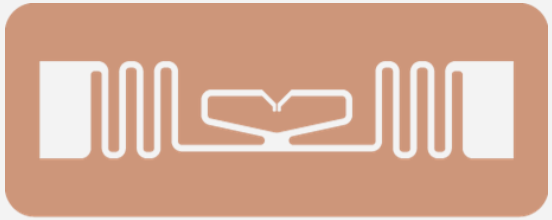
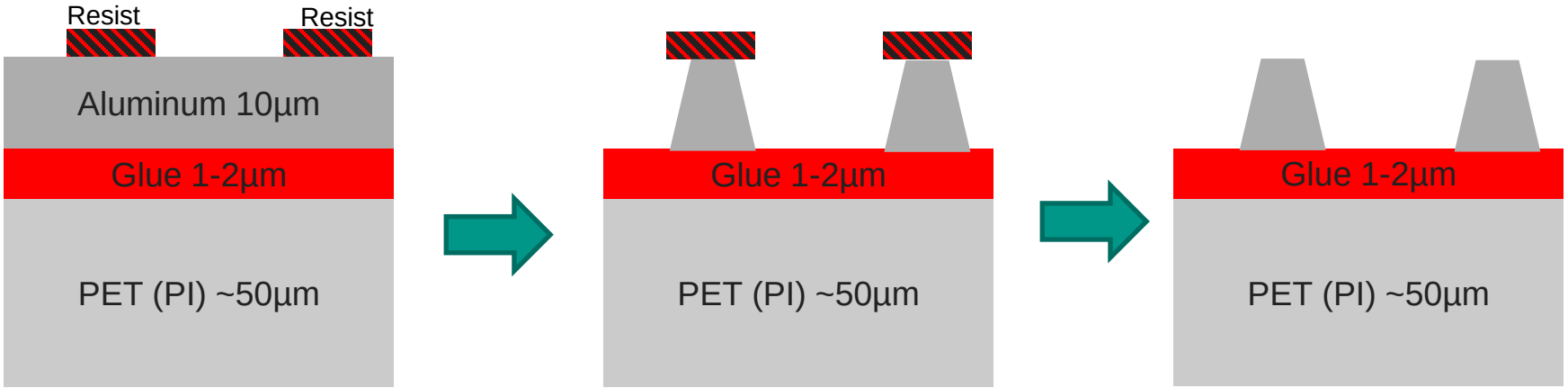
Subtractive Conductive Pattern + Material Waste



Additive Printing Conductive Pattern Only

The most common way to make RFID antennas is via chemical etching



This process uses toxic chemicals and is mostly done in China

The final product is non-degradable, non-compostable, non-recyclable and non-collectable

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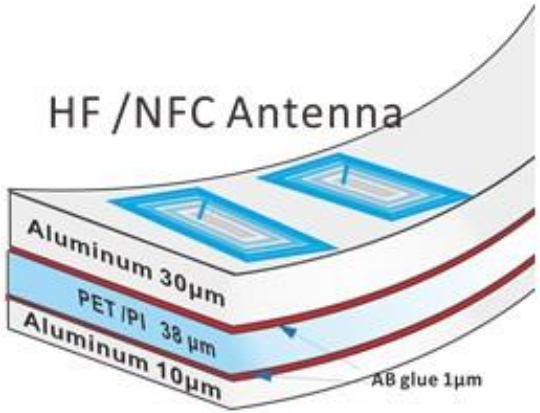
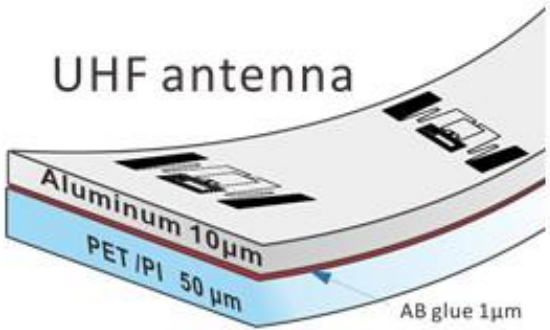
UHF antennas vs. HF/NFC





NFC?HF RFID antennas:

Higher accuracy

Aluminum on two sides

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The Copprint way – printing 3µm nano-Copper ink on Paper

Amount of copper per tag ~6mg
Equivalent to amount of copper in 3 chocolate bars

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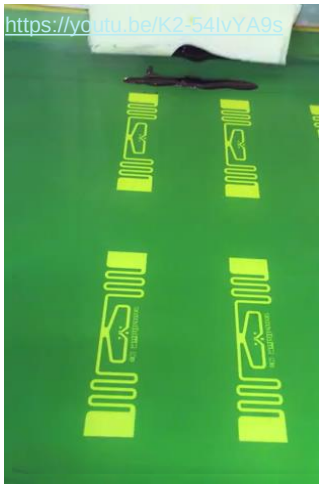
Really Simple Fabrication (Prototyping, Short Runs)

1) Print



Screen printing in few seconds

2) Dry

Drying oven/conveyor
1-60 seconds

3) Sinter

Standard hot press/laminator in few seconds under air

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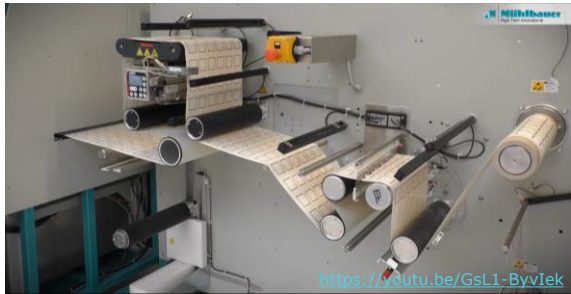
Muhlbauer APS tailored to Copprint ink

Industrial Scale Antenna Printing Solution

1) Print 2) Dry 3) Sinter

Fully autoamted POC – available now

High capacity R2R system – in development



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Printed RFID antennas – on every merchandise

RFID	Etched Aluminum on Plastics (PET) (>90% of the market)	Copprint Printed nano-Copper on Paper
Manufacturing	Highly polluting (China and Malesia)	Simple printing
Turnaround	6 weeks	1 week
Tag disposal	Non recyclable, non degradable – Plastics and Aluminum small pieces	Compostable, Green RFID – Copper, Minimal copper traces
UHF antenna cost	0.2-0.6¢	Up to 30% cheaper (depending on geometry/volume)
NFC antenna cost	1¢	<0.4¢

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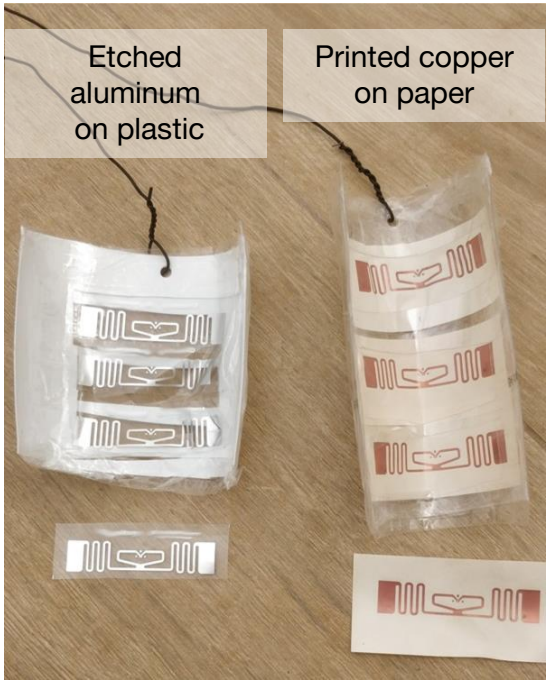
20B units 2019 ; Trilion units by 2030

We placed two types of RFID antennas in a home composter for 30 days, What do you think happened?



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Aluminum/PET

Before composting

After 30 days in the composter
No change.

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Copper/Paper

Before composting

After 30 days in a home composter
The paper and copper completely decomposes in the compost

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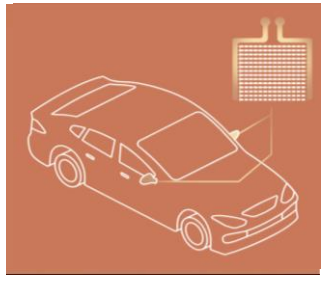
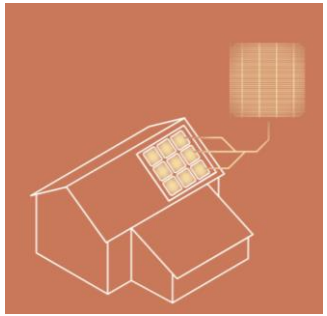
The Future of Printed Electronics is Copper.

We enable very-low cost, high conductivity, sustainable printed electronics.

- RFID antennas: Compostable & Cheaper
- Heaters, membrane switches, flex circuits: Copprint enables **5-10X cost saving** relative to silver inks (heating elements for car interiors, underfloor heating, simple PCBs).
- PV Cells: Replacing silver inks with copper inks for PV enable major cost reduction – e.g. 15% $/w for the Tesla PV modules.





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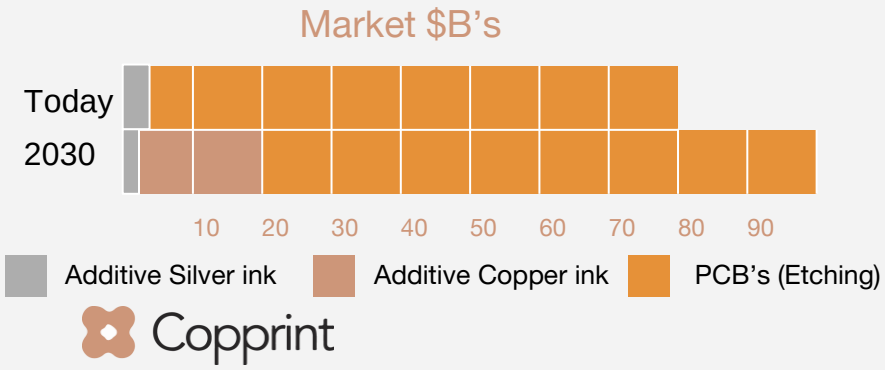
Unleashing The Additive Copper Market

For many years people tried to print copper (and failed). Motivation: Raw copper is 100x cheaper than silver

Copprint patented copper inks that outperform silver inks and are cheaper



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The Innovation

Copprint overcome the copper oxidation using a patented chemical sintering agent:

- Rapid low temperature Sintering which Prevents Oxidation
- Highly Conductive results
- Low Cost, Efficient (No Material Waste)
- Non-Toxic, Ecological, Green Circuits
- Substrate Freedom
- Standard "Air" Printing Process & Equipment

Copprint Copper inks vs. Silver inks

Anything you can print with conductive silver inks, **Copprint can do better. Faster. At a fraction of the cost.**

Copprint screen-printing Nano Copper Inks for a range of substrates:

LF-300 – Paste for paper substrate - Released

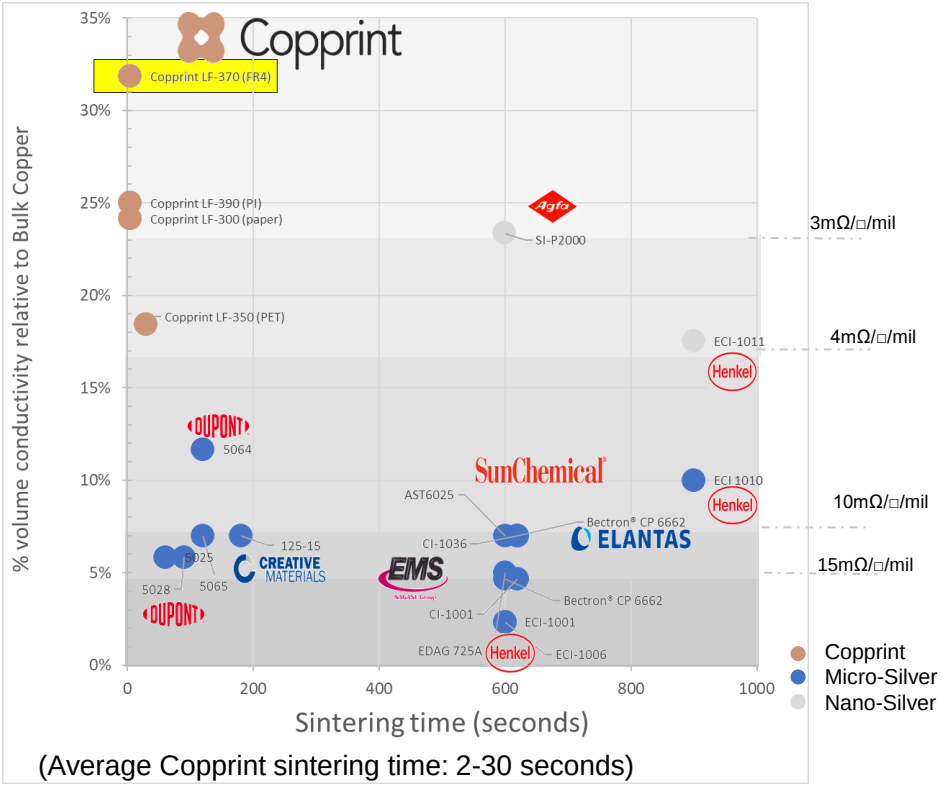
LF-350 – paste for PET substrate – Released

LF-370 – paste for FR4, Alumina, Glass substrate – Released

LF-390 – paste for PI substrate

LF-380 – paste for HJT PV cells

Additional substrates: PC, PEN, CFRP, Tesline



(Average Copprint sintering time: 2-30 seconds)

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Summary

- *Copprint enables* additive conductive printing from Nano Copper
- Our Nano Copper inks outperform silver inks, aluminum/copper etching, unleashing printed electronics manufacturing
- 5-10X savings/silver, higher conductivity
- Compostable RFID antennas and a green production process
- Supporting copper printing on Paper, PET, Alumina, FR4, Glass..
- First vendors to switch to copper ink will increase their market share dramatically

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