Conductive copper pastes for PV metallization

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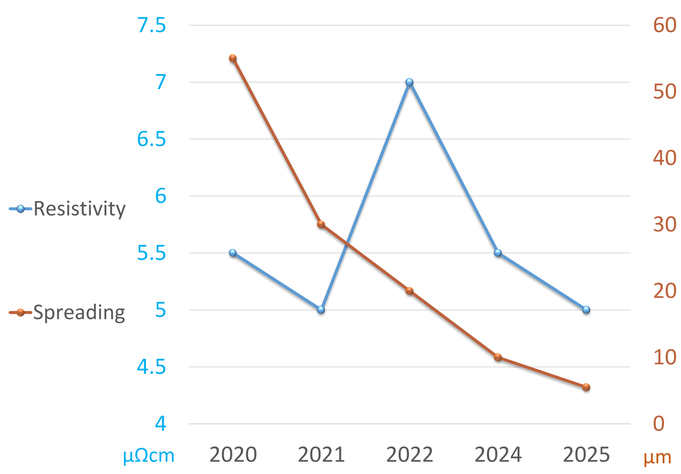
Introduction and Motivation

The silver demand by the PV industry is exceeding 16% of total global demand and is expected to continue growing alongside the increasing demand for solar panels. Therefore, there is a large motivation to replace, at least part of the silver usage by other more abundant metals.
Copprint's highly conductive copper pastes present an excellent alternative. The printing process is identical to the current screen-printing method, and the paste price is significantly lower than the standard silver pastes.

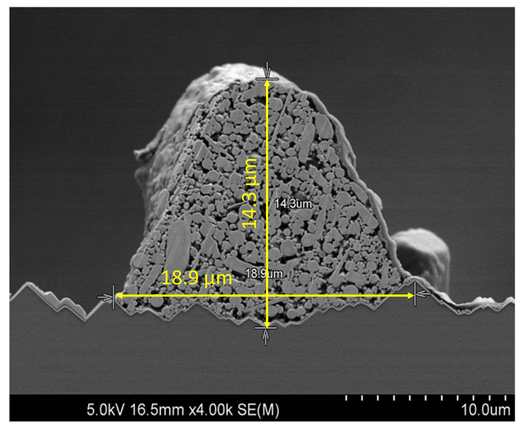
Copprint paste evolution



Spreading is measured on the side of the finger.

0 gen	LF-350	2020	5-6 µΩcm	55 µm spreading
1st gen	LF-371	2021	5 µΩcm	30 µm spreading
2nd gen	LF-380	2022	7 µΩcm	20 µm spreading
3rd gen	LF-365	2024	5-6 µΩcm	9-12 µm spreading
4th gen	LF-366	2025	5 µΩcm	5-6 µm spreading

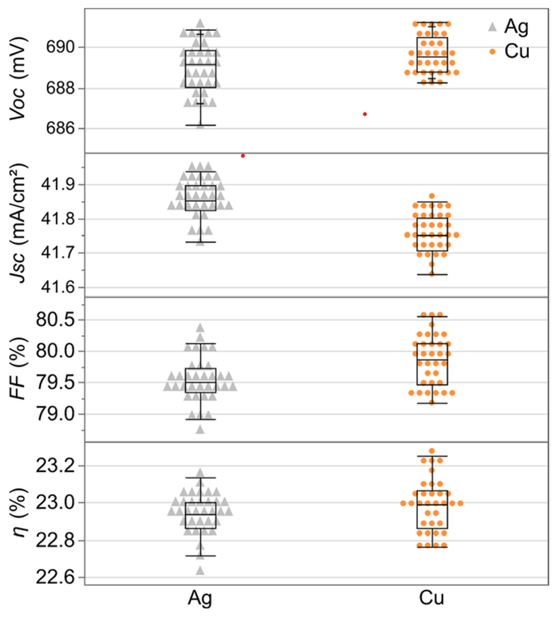
LF-366 cross-section



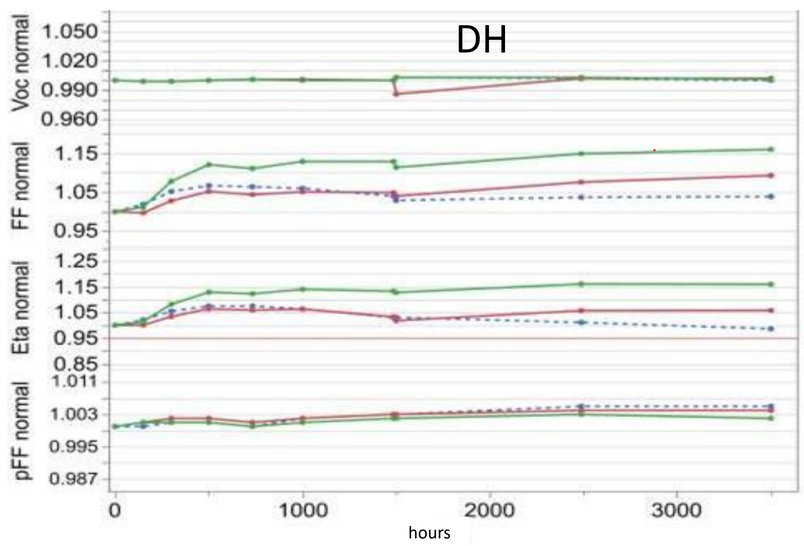
Screen parameter: finger opening width: 20 µm.

Printing performance and aspect ratios are comparable to standard silver and silver-coated copper pastes.

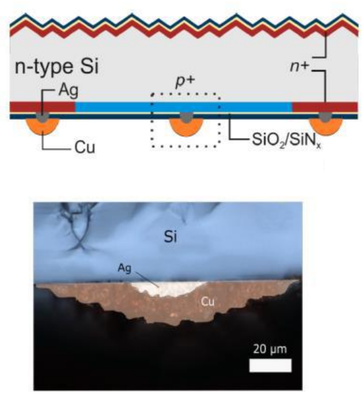
ISC Konstanz IBC Zebra cells with Cu Busbars and fingers



Same efficiency was achieved for both the Cu metallized group and the reference Ag metallized group with average efficiency of 23%.



The solar cells are stable and no Cu in-diffusion is observed under damp heat (85 °C, 85% relative humidity).

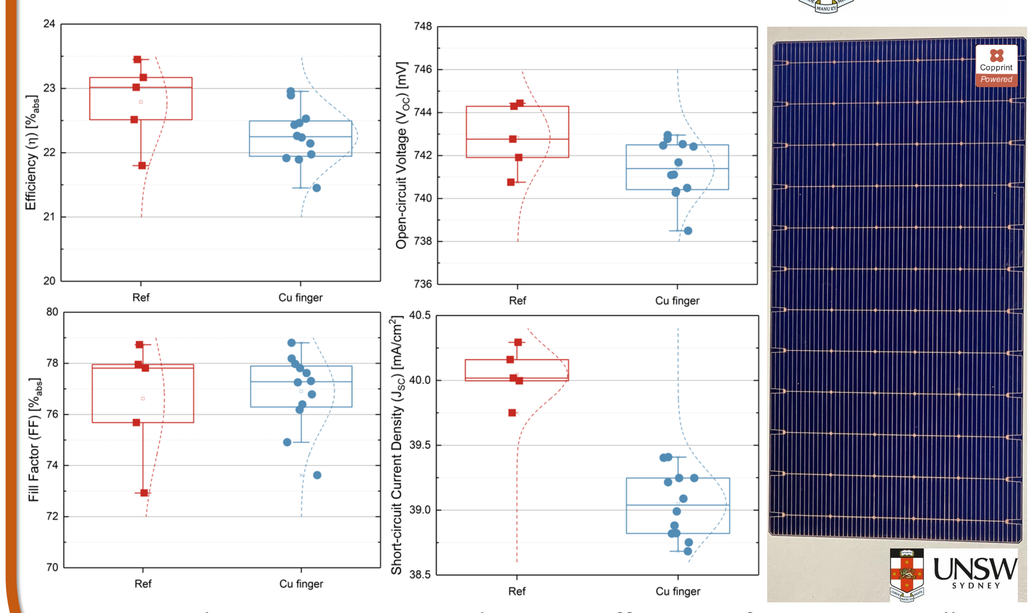


Cu finger on Ag contacts

Chen, Ning, et al. "Thermal Stable High-Efficiency Copper Screen Printed Back Contact Solar Cells." Solar RRL 7.2 (2023):2200874

UNSW HJT cells results

UNSW SYDNEY

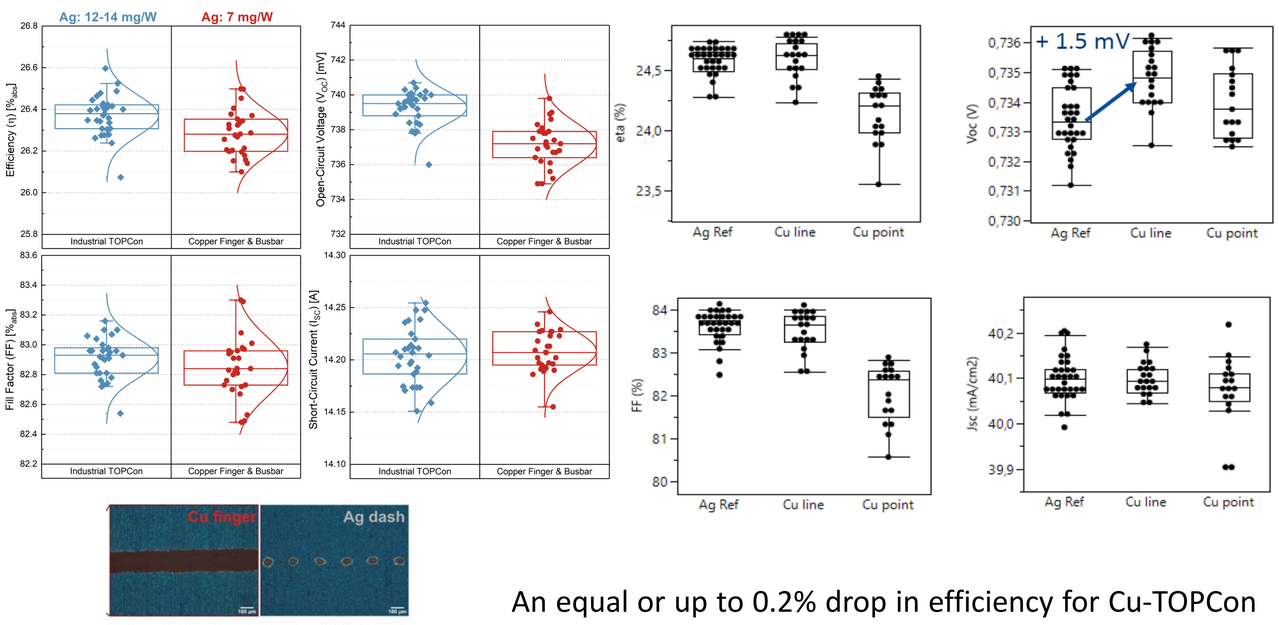


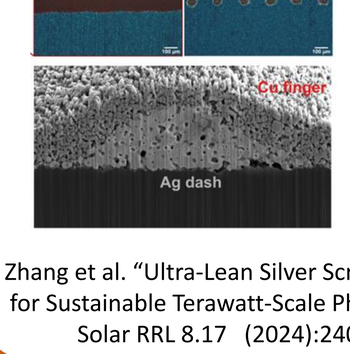
An equal or up to 0.5% drop in efficiency for Cu-HJT cells is demonstrated.

TOPCon

UNSW SYDNEY

ISC Konstanz





An equal or up to 0.2% drop in efficiency for Cu-TOPCon cells.
Soldering on Cu-BB with high peel force is possible.

Zhang et al. "Ultra-Lean Silver Screen-Printing for Sustainable Terawatt-Scale Photovoltaic." Solar RRL 8.17 (2024):2400478

Lossen et al., "Screen Printed Cu-TOPCon Cells With Reduced Ag Consumption.", EUPVSEC 2025

Copprint

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