

News Release

from DKN Research, Haverhill Massachusetts

& NY Industry, Otsu Japan

**Total Printing Process Technologies
for Advanced High Density Printable Flexible Electronics.**

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DKN Research, a Massachusetts based advanced printed circuit engineering firm, and **NY Industry**, an Otsu, Japan based firm engaged in manufacturing for flexible substrates, teamed up and co-developed a package for a printing process to produce high density flexible electronics circuits.

Over the last several years, many organic electronic materials were developed to realize printable electronics; unfortunately, only limited circuits with special construction are in commercial use at high volume production level. The reason is the lower resolution and multi-layer capabilities compared to the traditional photolithography processes. Specifically, no basic printing process has been established for multilayer fine flexible circuits with micro via hole connections.

DNK Research from Haverhill Massachusetts, a global engineering leader for advanced flexible circuits, and NY Industries Co., Ltd., based in Ohtsu, Japan, known as a technology leader for the printing process of flexible circuits, recently co-developed a series of printing process technologies generating fine traces with micro via holes for functional printable electronics. The new process is capable to produce single side, double side and multi-layer circuits with embedded passive and active elements. Screen-printing technologies were introduced for the entire manufacturing process, and fine line resolution with conductive paste reached to 30 microns line and space. It is comparable to copper circuits generated by a fine etching process with photolithography. The new printing technologies are capable to print not only conductive and insulation materials, but also resistor materials, high dielectric constant materials and various active materials including semiconductors. Double-sided circuits, whose through hole diameter is 80 micron diameters, and multilayer formation are possible. Additionally, not only can resistance, capacitors and coils be directly embedded, but elements using active materials such as semiconductors can be embedded as well. Moreover,

anisotropic conductive materials can be printed for connections with other circuits and devices. Broad varieties of the base materials including papers and high-performance plastic films are available for the customer's convenience.

This new technology is environmentally friendly; since the manufacturing process does not use any wet chemicals, there are no chemical waste byproducts.

Significantly lower costs could be possible using the roll-to-roll process for high volume production instead of the sheet-by-sheet process, and the functional flexible circuits can be realized, which copper circuits generated by subtractive process with photolithography were not able to achieve in the past. Specifically, large markets can be expected for panel switch boards, high function sensor modules, high function antenna modules, high function lighting, flexible displays, flexible solar cells, flexible actuators, flexible speakers and many kinds of disposable devices.

Currently, while getting ready to provide the design guide for uses, DKN Research has begun taking orders for prototypes with design consulting. Appropriate circuit constructions and materials will be advised for the customer's purposes. NY Industry is ready for the small volume productions. Roll-to-roll process for large volume production will be installed in the future according to the customers' requirements.

Taking advantage of the process's flexibility, DKN Research is putting a technical support system in place for actual circuit design aimed at the processing of various functional materials under development.

Contact

U. S.: DKN Research, Haverhill Massachusetts

www.dknresearch.com

Robert Turunen: rturunen@dknresearch.com

1-978-376-4144

Japan: NY Industry Corporation, Otsu-shi, Japan

www.ny1.co.jp

Takashi Yamamoto: mado@ny1.co.jp

81-77-544-0236

Attached Photo: Example of Fine Conductive Patterns

