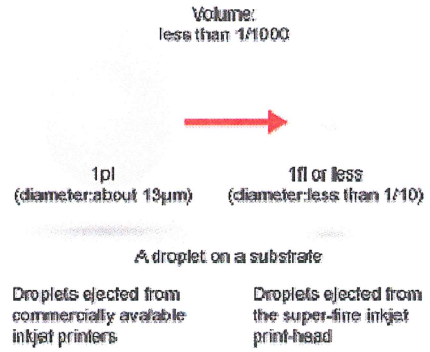
LABORATORY CO., LTD.

IPR2013-00066

Features of super-fine inkjet technology

The super-fine inkjet technology developed by the Nanotechnology Research Institute of AIST allows the ejection of super-fine droplets much smaller than the conventional droplets ejected by a conventional inkjet printer-less than 1/10 the size and less than 1/1000 the volume of conventional droplets.



Awards

March 8, 2002

Nano-Tech Award (on Nano Fabrication Technology) at the 1st International Nanotechnology Exhibition and Conference, nano tech 2002.

April 1, 2004

AIST President Award 2004 (Real Research Award).

June 20, 2004

Nippon Keidanren Chairman's Award of the Conference for the Promotion of Collaboration among Industry, Academia and Government.

April 19, 2006

A paper, “Fine Pitch Micro-bumps and Micro-wires Printed by Super Inkjet Technology,” published in ICEP2005 won the best-paper award.

October 27, 2006

Special Award of the 2nd Tsukuba Venture Award (Tsukuba High-Tech Award).

April 4, 2012

Super Inkjet Head Unit won an Excellence Award at 24th Small and Medium Enterprise New technology/Product Award.

August 9, 2012

Our advertisements on “nature” won the Award of “Honoring Advertising Excellence".

November 20, 2012

Super fine inkjet printer won the Excellence prize of the Tokyo Venture Technology Award.

February 1, 2013

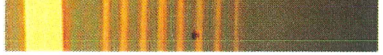
Printable Electronics Award (Originality Award) at the Printable Electronics2013.

June 12, 2013

We won the technology award with development of Super Inkjet technology from the Imaging Society of Japan.

Precision placement of nano-materials

Critical to the implementation of nanotechnology is a deposition methodology that allows novel materials to be precisely added to conventional CMOS components in a scalable manner. Out super-fine inkjet technology enables the precise arrangement of various nanomaterials on a any type substrate.



- Carbon nanotube

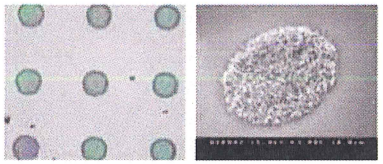
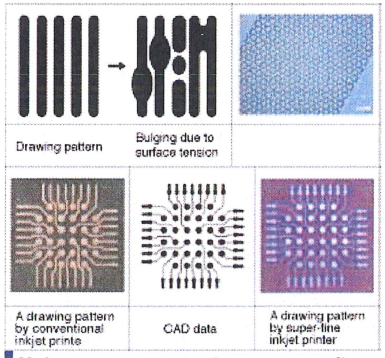


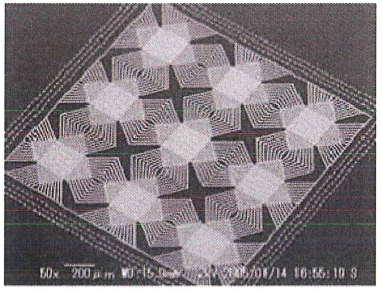
Photo credits
Associate Prof. Hiroki Ago
Institute for Materials Chemistry and Engineering
Kyushu University

Maskless precision patterning



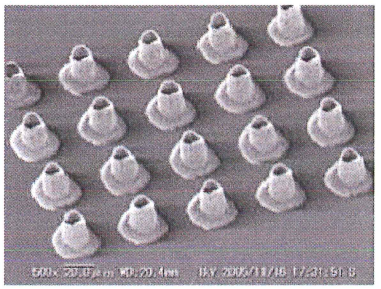
With traditional patterning method satisfactory liquid placements is a challenge as bulges may develop due to the surface tension of the liquid. The effect is exacerbated as feature sizes approach 10 microns and lower. Our super-fine inkjet technology effectively avoids this problem by accelerating the drying of a line, thus minimizing the disruption in a pattern formed in a liquid state.

Using nanopaste to draw a super-fine wiring pattern



An interesting aspect to metals is that for particles smaller than 20 nm in diameter, the effective melting point decreases dramatically. For example, the melting point of a super-fine silver particle may be as low as room temperature, whereas a micron sized particle of silver melts at 961ºC! Using a solution with these nano-size particles as ink, with out novel printer, enables maskless patterning with a line width of several microns, which is comparable to the photolithographic methods, but at room temperature and normal atmospheric pressure!

Forming a three-dimensional structure



Because super-fine liquid droplets dry very quickly, the droplets can be accumulated to form a three-dimensional structure by shooting them at a fixed target.

Super inkjet printer

	Out super-fine inkjet system is compact and can be placed on a desktop. The system allows single micron scale patterns comparable to the photolithographic methods to be drawn directly under normal temperature and normal atmospheric pressure.

please contact for more details.
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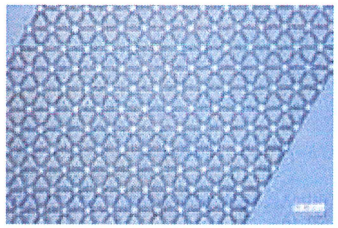
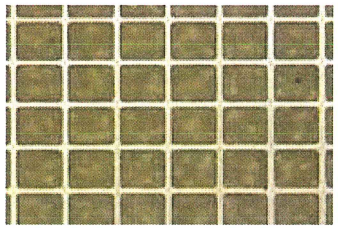
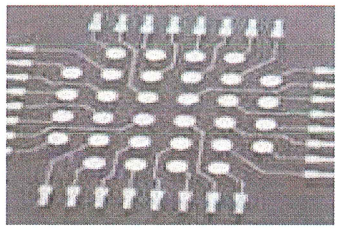
Features

◆Droplet volume：0.1fl (femtoliter)～10pl (picoliter)， Line width 0.5μm ～ several dozen μm.
◆Viscosity range ：0.5～10,000cps (non-heated).
◆Large variety of usable fluids：Conductive ink, Insulating ink, Resist ink, UV ink, Solvent ink, Protein material, etc.
◆Software：Easily programmable for printing.
◆Nozzle：Disposable, Low cost, easily-exchangeable.
◆Camera：Real-time observation, You can see what's going on the substrate.

Example of Application

		
Silver ink Line:3μm Distance:15μm	Gold ink line:5μm Pitch:50μm	Circuit pattern line:under10μm

◆Advanced technology ▪Printable electronics ▪Solar-cells ▪Touch panels ▪LED
◆Alternative technology ▪Partial platings ▪Resists coating ▪Bumps forming ▪Dispenser devices
◆Optics technology ▪Photomasks ▪Microlenses ▪Microfilters
◆Biotechnology ▪Pipetting device of protein material ▪Cell scaffolds ▪Microarrays

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