Inkjet Printing of Silver Inks for RFID, Solar cells and Printed Electronics

A number of materials companies here in the US and in Asia-pacific region are either already offering or developing inks that can be printed using drop-on-demand inkjet technology for applications ranging from RFID to Si-solar cells to Printed electronics.

The companies in the US offering inkjettable silver inks as either nano-silver particle inks or as organo-metallic inks are Cima NanoTech, Cabot Corp., NanoMas and UT Dot among others. In Asia-Pacific region companies such as Ulvac of Japan and InkTec of South Korea have been offering the inks for a number of years now. By one estimate more than one hundred companies are offering silver inks in Korea for a range of applications including RFID, Solar cells, and Printed electronics.

MicroFab's **SilverLine™** technology is based on piezoelectric drop-on-demand printing technology. It is capable of printing very fine lines as small as 50µm wide. The length of lines can be as small as the width of the line to several orders of magnitude higher (i.e., mm or more). An example of the printed lines is shown in **Figure 1.**

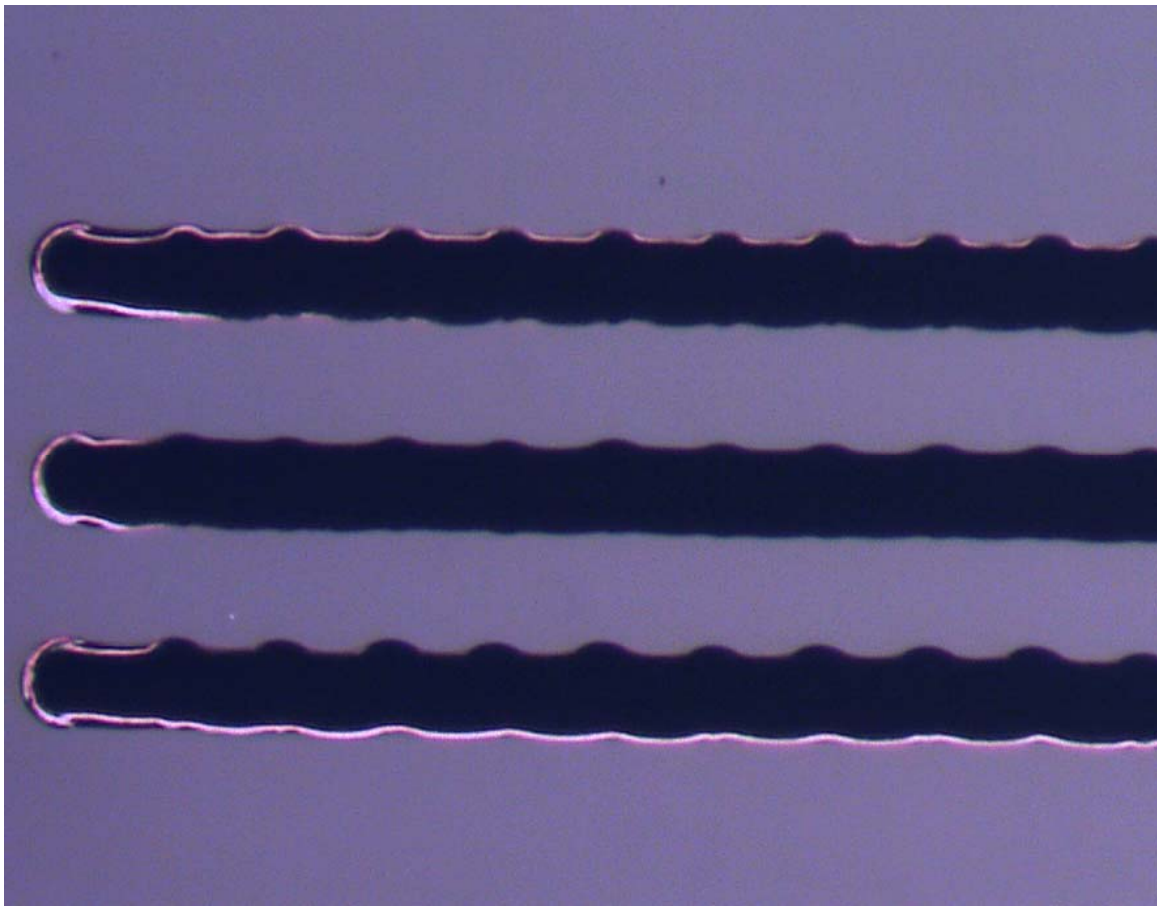

Figure 1: Cima Nanotech's silver ink; 47µm wide on 115µm centers.

These types of silver inks can be printed in variety of shapes such as coils or rectangular areas as RFID antennae or current collectors for solar cells. **Figure 2 and 3** show such examples of printed antennae, and printed current collectors on Si-solar cells.

Figure 2: Antennae printed using Cabot's silver ink; 10mm across

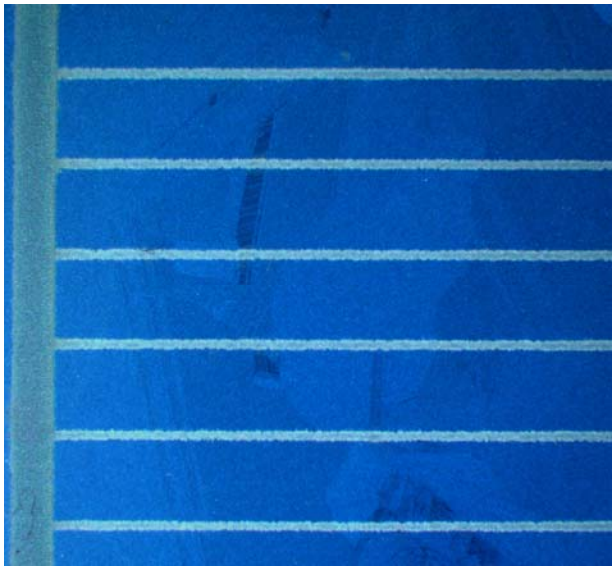

Figure 3: Printed bus bar (2 mm wide) and current collectors (average 210 µm wide) of a Si-solar cell;