

INTEGRATED INKING CHIP FOR MULTI-INK DIP PEN NANOLITHOGRAPHY

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A liquid-inking chip for effectively addressing (inking) multiple nanolithography tips in a high-density array has been developed. The microfluidic chip was realized by individually patterning a thin PDMS membrane over wafer through-holes as contact inking pads. Inks are supplied to the inking pads from reservoirs through backside microfluidic channels. The thin PDMS membrane allows gases and vapors to permeate through while preventing liquid itself from overflowing or evaporating. The new inking chip provides high-density inking, easy loading, and minimal ink loss. A successful set of scanning-probe contact-printing experiments was performed with the inking chip.



Fabricated inking chip with 4 reservoirs (left). A SPCP probe is being inked by contact (middle). Ten seconds, 30 seconds, and 1 min of contact printing resulted in patterns in the sizes of 600 nm, 1.3 μm , and 1.8 μm (right).