

UV Curable Polymer Printing Kit

Introduction

The UV Curable Polymer Printing Kit includes all the reagents and consumables necessary for patterning microscale UV curable polymer arrays using NanoInk's Dip Pen Nanolithography[®] (DPN[®]) Systems and tools.

Applications

Microscale patterning of polymers has utility in several different fields including tissue engineering, cell-cell and cell-surface interaction studies, flexible electronics development and microlens construction. Traditional polymer micropatterning techniques include inkjet printing, direct laser writing, microcontact printing and photolithography, but printing UV curable polymers using tip based nanolithography techniques offers many benefits.

UV Curable Polymer Patterning

The UV Curable Polymer Printing Kit is compatible with all NanoInk nanofabrication systems and consumable fabrication tools. The viscosity of a polymer solution has a large impact on the ease of printing the polymer at the micro-scale; it is challenging or impossible to print high viscosity polymer solutions using conventional deposition techniques. NanoInk's tip-based nanolithography platforms can easily print materials with viscosities above 20,000 cP, and the viscosity of the UV curable polymer in the UV Curable Polymer Printing Kit is 22,000 cP. Figure 1 shows an atomic force microscope image of an array of UV curable polymer features created by the NLP 2000 System with the UV Curable Polymer Printing Kit.

Features and Benefits

Patterning flexibility: Using NanoInk's tip-based lithography systems and consumables with the UV Curable Polymer Printing Kit, users can easily manipulate the polymer printing process to create any number of micropatterns.

Customizable feature sizes: Feature sizes of 2 - 10 μm can be created by selecting the appropriate cantilever "pen" tip to deposit features, specifying the cantilever "pen" contact time with the substrate, and adjusting the patterning environmental conditions.

Highly uniform features: DPN system-generated polymer domains typically exhibit a coefficient of variation (CV) of 15% over the entire pattern.

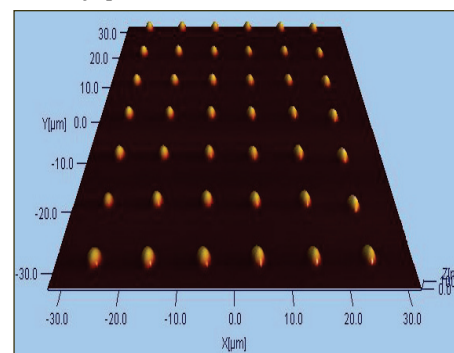


Figure 1: Atomic force microscope image of a UV curable polymer pattern with features of $\sim 2.5 \mu\text{m}$ in diameter and $\sim 120 \text{ nm}$ in height.

UV Curable Polymer Printing Kit

(continued)

High throughput printing: The UV Curable Polymer Printing Kit is capable of depositing hundreds to thousands of features per loading.

Kit Components

The UV Curable Polymer Printing Kit (Figure 2) includes all cantilever “pens” (Figure 3), solutions and substrates necessary to pattern polymers, as well as a detailed printing protocol:

- Multi-Array Type-M Pens, Qty. 5
- Silicon Dioxide Substrates, Qty. 4
- Polymer Printing Solution, 100 μL
- UV Curable Polymer Printing Protocol

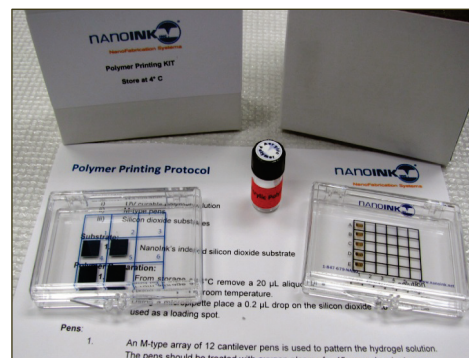


Figure 2: UV Curable Polymer Printing Kit

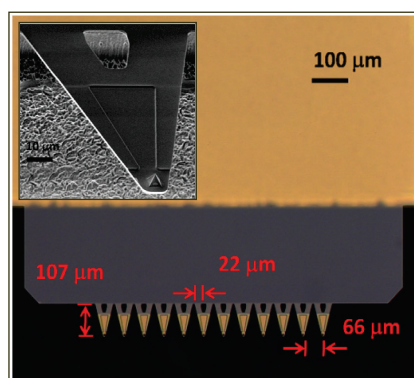


Figure 3: Type-M “pens” contain an array of 12 A-frame shaped cantilever “pen” tips spaced 66 μm apart. Probes have a spring constant of 2.6 N/m and a specially-designed, recessed channel for improved transport of printing liquid.

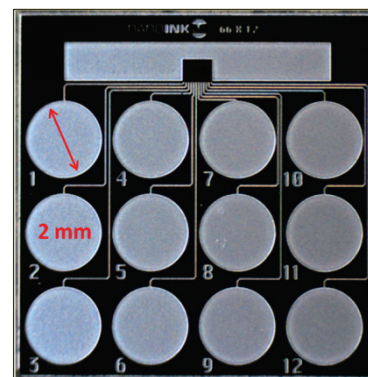


Figure 4: Type M-12MW “inkwells” contain 12 separate reservoirs that feed printing liquid to the microwells into which “pen” tips are dipped. Channel spacing matches the “pen” tip spacing of Type-M “pens.”

System Compatibility

For use with the NLP 2000 System, DPN 5000 System, and NSCRIPTOR™ System