Advanced Tool for Dip-Pen Nanolithography: Nano-Fountain Pen

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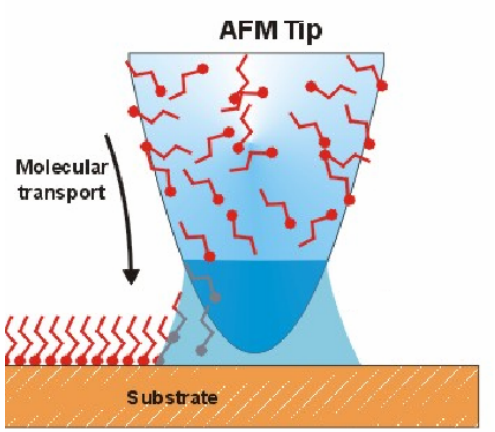
Fountain Pen Nanolithography



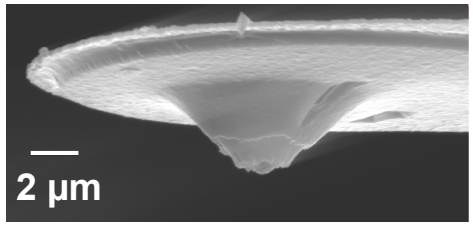
Science **283**, 661 (1999)

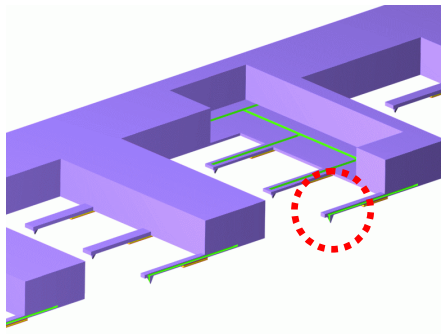
- **Dip-pen nanolithography (DPN)**

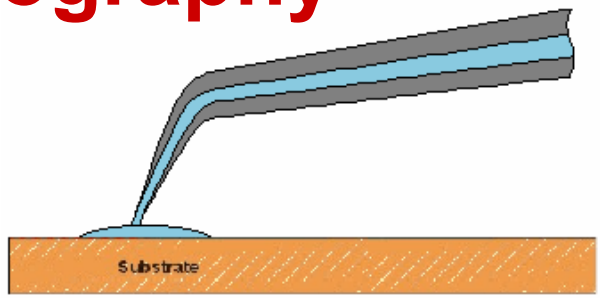
Limitations in DPN

- **Re-inking**
- **Low speed & low throughput**

Nano Fountain Active Probe (NFAP) array





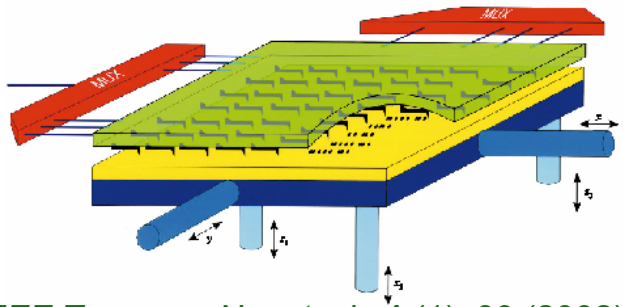


Appl. Phys. Lett. **65** (5), 648 (1994)

- **Micropipette-based atomic force microscopy (AFM) probe**

Continuous ink-feeding

Parallelization

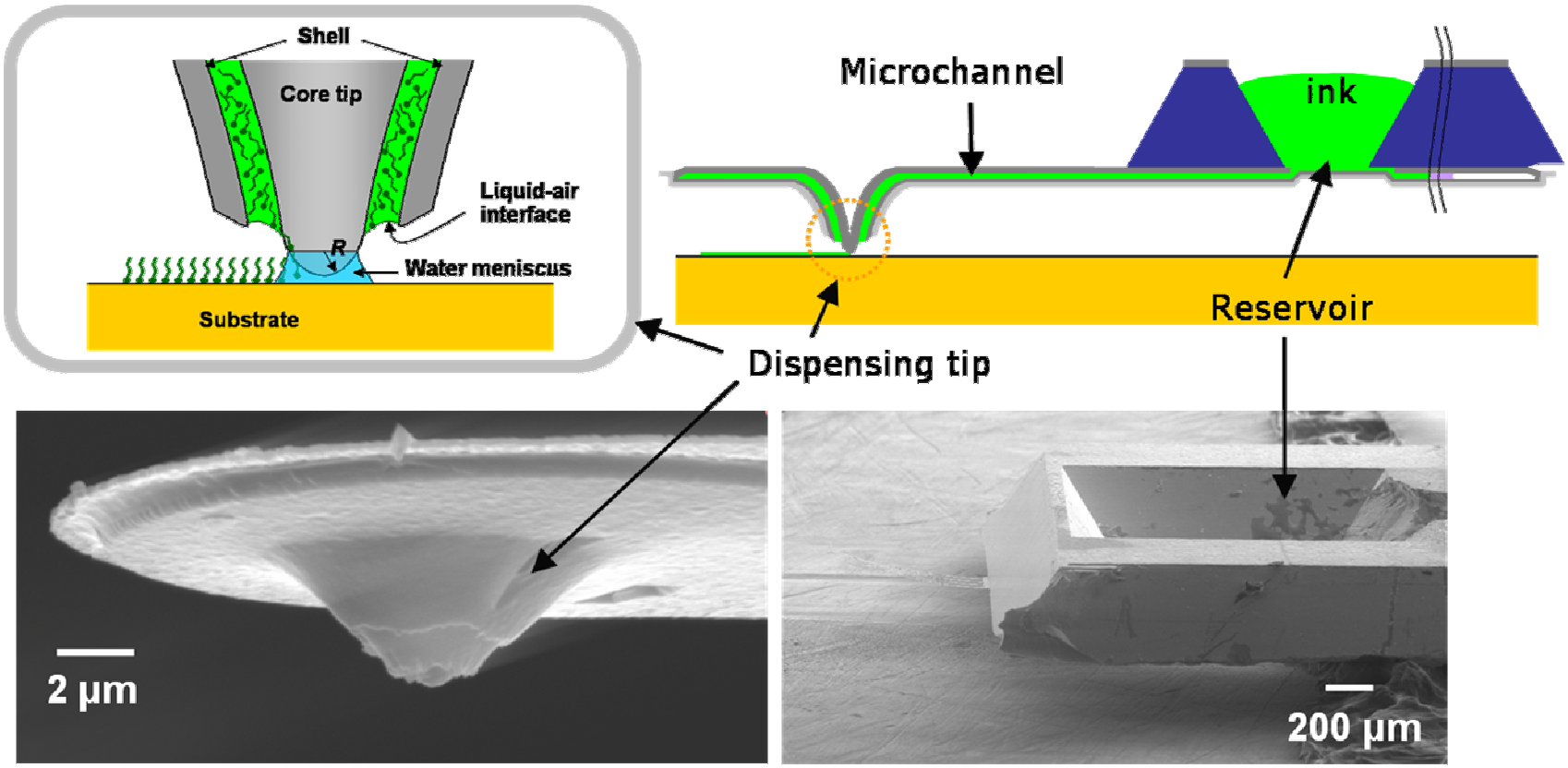


IEEE Trans. on Nanotech. **1** (1), 39 (2002)

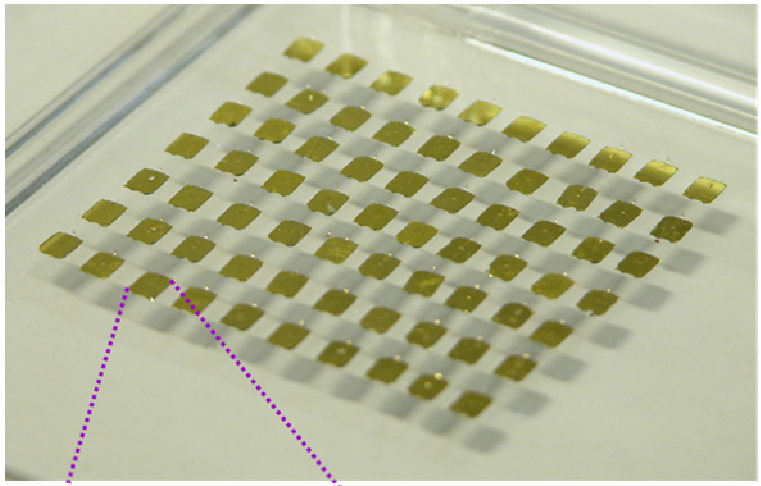
- **Millipede: parallel read/write**

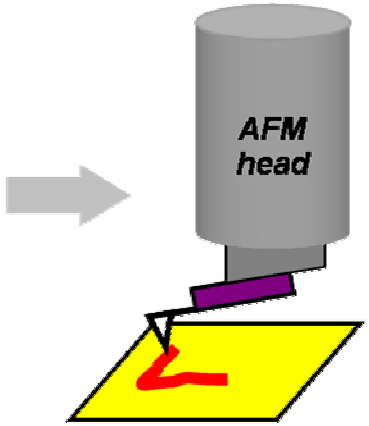
Concept of Device

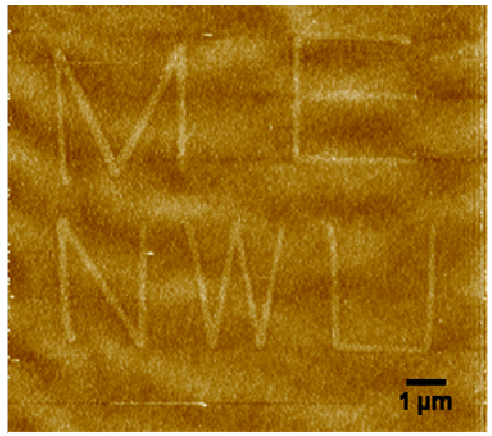
- Batch fabrication by micromachining technologies
- Cantilever with embedded microchannels
- Volcano-shape dispensing tip
- On-chip reservoir (~1 mm^3)

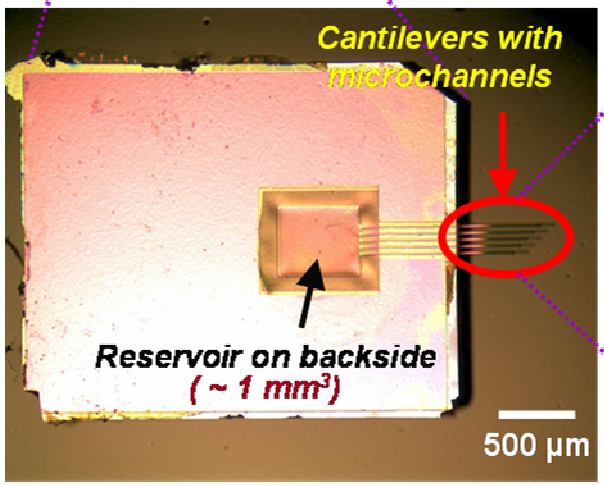


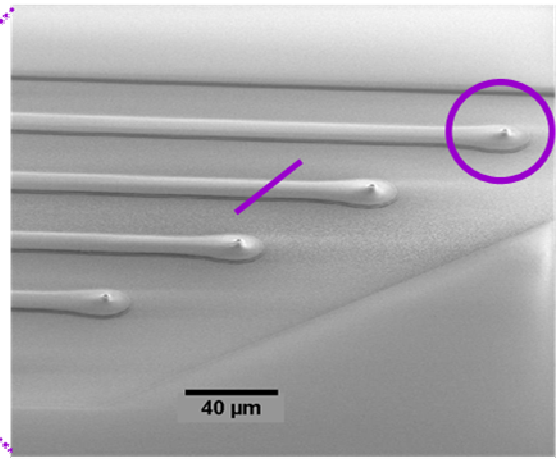
Nano Fountain Probe Chip



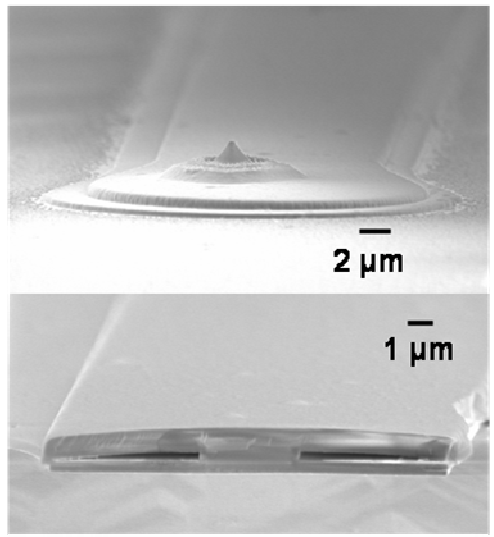








Cantilevers prior to release



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