Supporting information

Prepolymer solution loading. A drop of the solution without the capture DNA was loaded into wells 1, 2, and 3 of Figure 1a. Vacuum was applied to well 4 until all the channels were filled with the solution. The residual of the first solution in well 1 was aspirated and a large drop of the pre-polymerized solution with the capture probe was placed into well 1. Vacuum was again applied to well 4 until most of this drop flowed through the wider DNA channel. Finally, a small drop of the solution with the capture oligonucleotide was inserted into well 4. In order to prevent hydrodynamic flow within the channels during the photopolymerization, the wells were covered gently with 254 micron thick PDMS sheets after the solutions were loaded.

Prepolymer solution loading for multiplexed array. We first gently loaded the solution without the capture DNA probe by a syringe through well 4 until the solution flowed into the other two gel channels without forming bubbles, then loading was completed by vacuum as described above. The pre-polymerized solution containing only capture DNA *M13mp18* was introduced into the channel between wells 2 and 3 by vacuum. After solution loading, all wells were covered with PDMS sheets and photopoylmerization proceeded as described above. Similarly, prepolymer solutions containing only K12probe1 and only K12probe2 were prepared in the second channel between wells 4, 5 and the third channel between 6, 7 respectively.