Supplementary Material (ESI) for Lab on a Chip

Supporting Information

Simultaneous Sorting of Multiple Bacterial Targets Using Integrated Dielectrophoretic-Magnetic Activated Cell Sorter

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This section provides supporting information on detailed fabrication process of the iDMACS.

SUPPORTING INFORMATION

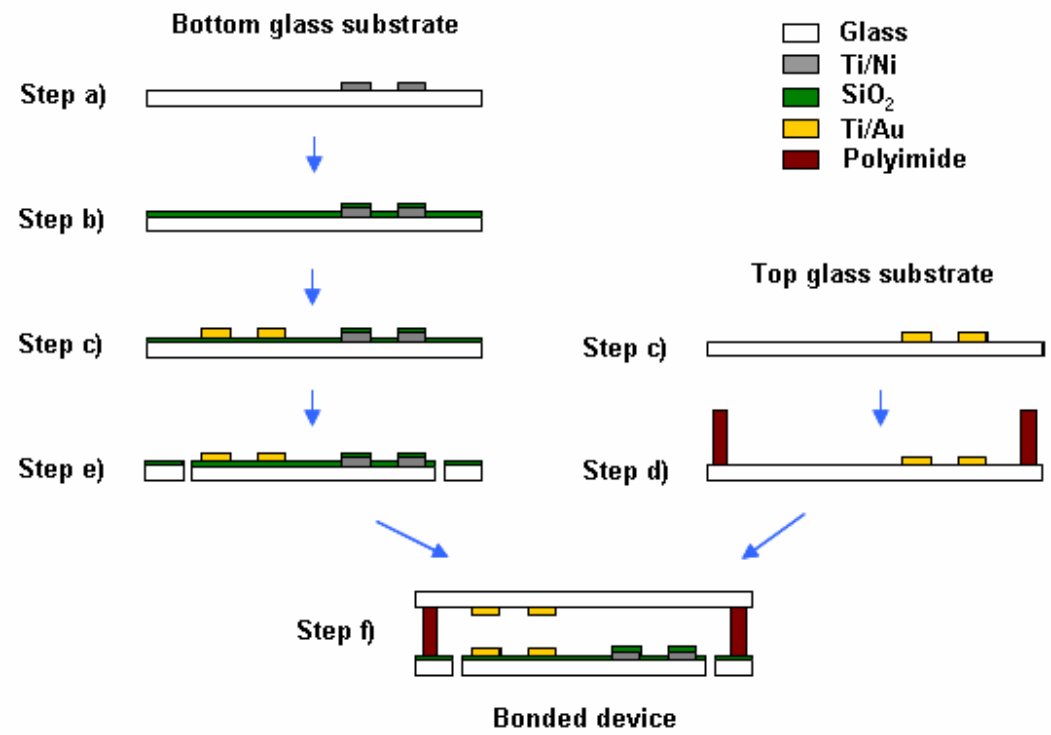

Figure captions

Figure S-1. Schematics of the fabrication process. Step a) Ni strips were patterned with 20 nm of titanium and 200 nm of nickel via a standard lift-off process (Temescal, Berkeley, CA) on 4-inch glass wafers (Pyrex 7740 borosilicate glass; Corning, Corning, NY) as bottom substrate. Step b) A 100-nm-thick passivation layer of SiO_2 was deposited by plasma-enhanced chemical vapor deposition (Plasma-Therm, Prosper, TX). Step c) Top and bottom DEP electrodes were patterned with 20 nm of titanium and 200 nm of gold (Temescal). Step d) The microchannels were formed with photosensitive polyimide (HD4010; HD MicroSystems, Parlin, NJ) on the top substrate, which served as the spacer between the two glass substrates. It was spun on the top and bottom substrates at 1,000 rpm for 45 sec, which results in a 20-μm-thick film after curing and bonding. Channels were defined on this layer by photolithography using a standard photolithographic tool (SUSS MicroTec, Garching, Germany; 350-nm wavelength, 1-min exposure) and development process (2 min in 100% developer, 1 min in 50% developer and 50% rinser, and 30 sec in 100% rinser). Step e) Microfluidic vias on the top substrate were drilled with a computer-controlled milling machine (Flashcut CNC, Menlo Park, CA), and both substrates were diced. Step f) The two substrates were aligned and bonded at 300 °C for 2 min using a Flip-Chip aligner bonder (Research Devices, Piscataway, NJ). To complete the bonding process, a wafer bonder (SB-6; SUSS MicroTec) was used to cure the polyimide layer at 375 °C for 40 min and then bond for 10 min. Microfluidic inlets and outlets were manually fixed on the drilled vias of the device using epoxy.