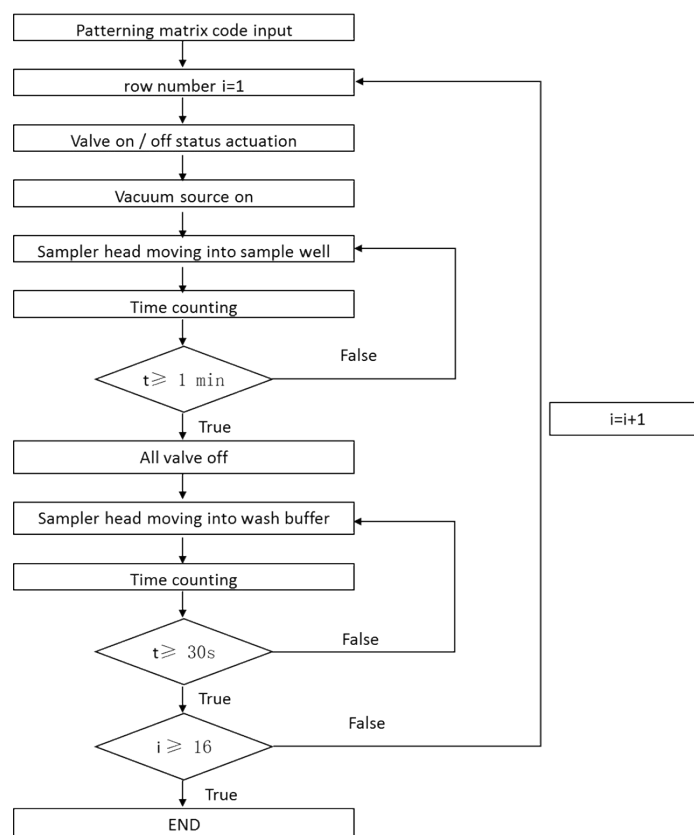


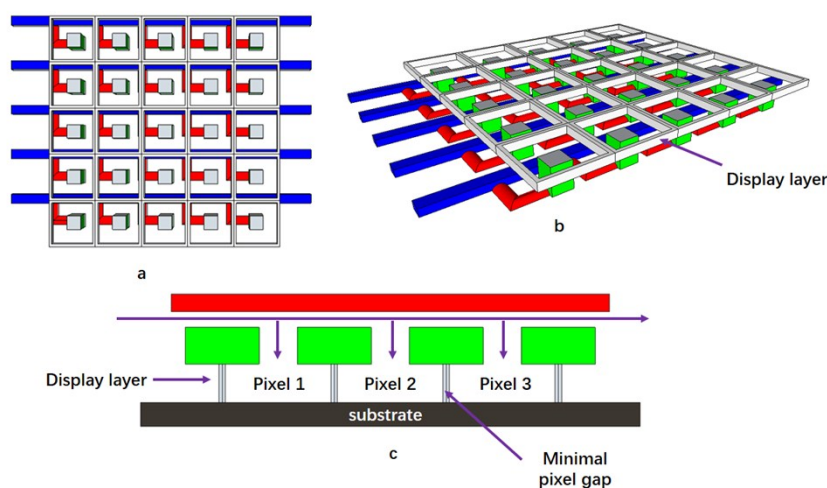
Supplementary information

1. Flow chart showing the detailed patterning process



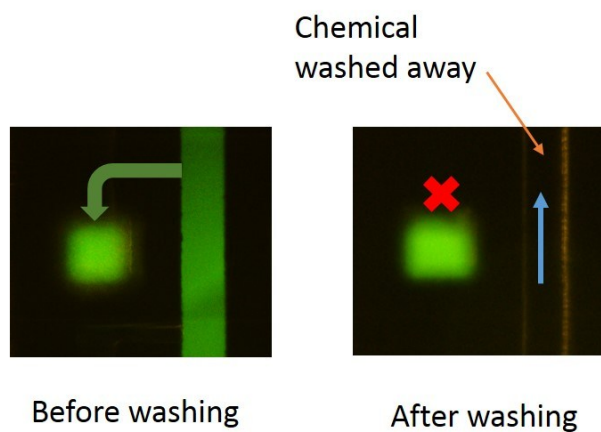
SI Fig.1 Flow chart of the entire patterning process

2.



SI Fig. 2, schematic drawing of top (a), perspective (b) and side view (c) of new designed chip with an additional display layer for guiding fluid to form more closed pixel

3. As evident, we provided a further characterization to prove that cross contamination would not happen after a fully washing step. As shown in SI Fig. 1, in the washing step, the valve was closed and the chemical in the main channel was washed away. After washing, no chemical was left in the main channel and round channel whereas the patterned pixel was retained. For next chemical patterning, previous patterned pixel was closed and no chemical would leaked and no cross contamination would happen.



SI Fig. 3