ARTICLE

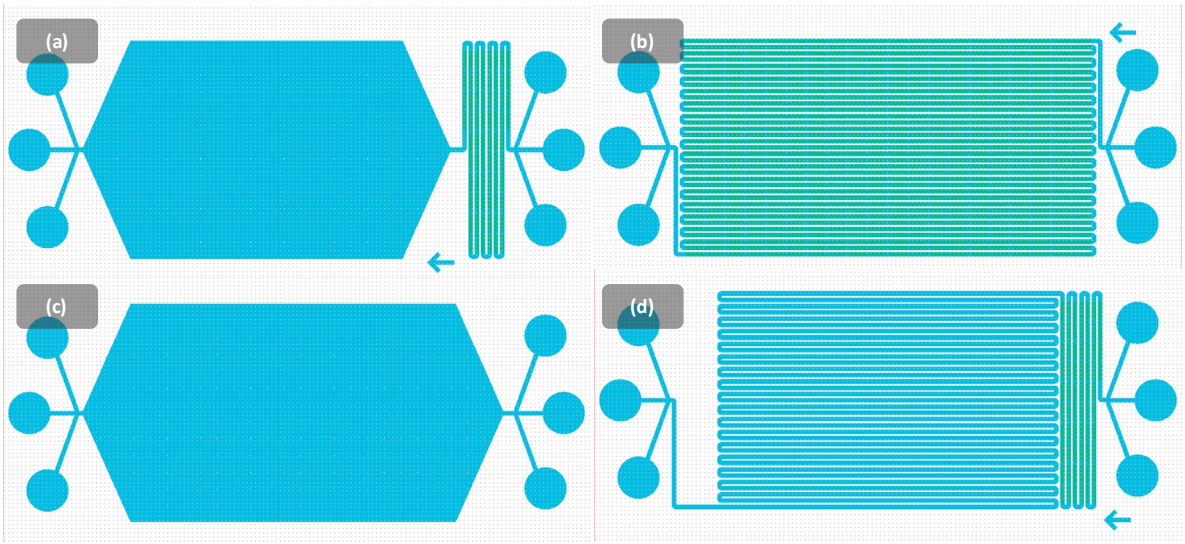

Fig. S1: Four different PDMS chip designs. (a) mixing channel followed by reaction chamber. (b) long mixing channel. (c) reaction chamber (d) mixing channel followed by a long channel without mixing channels.

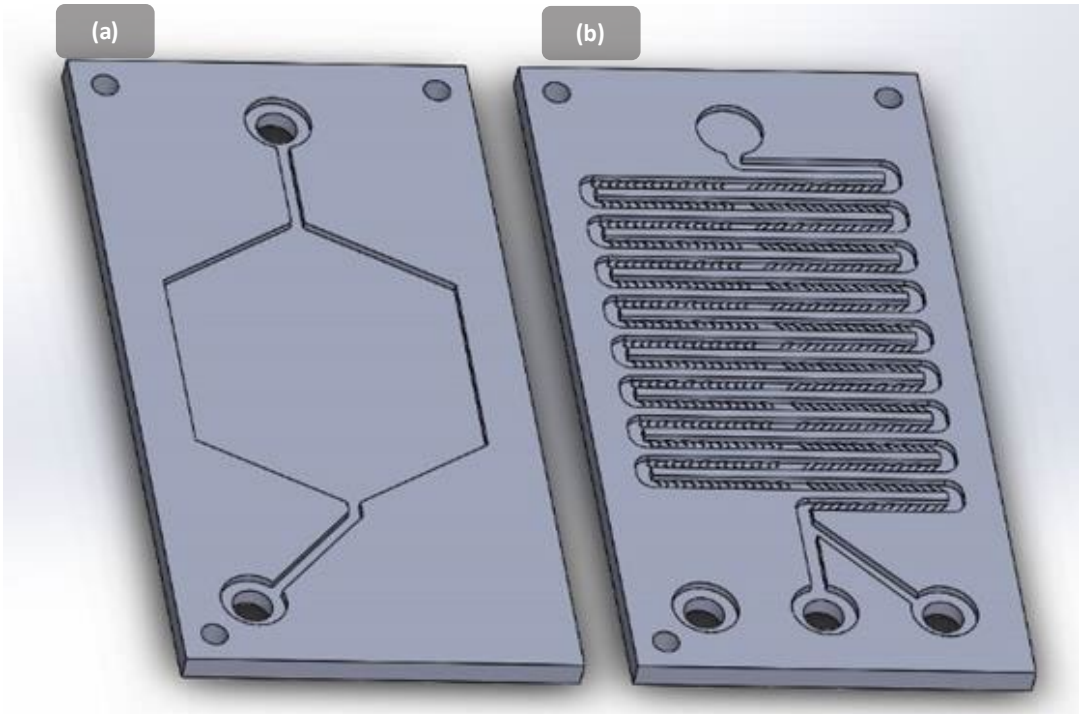

Fig. S2: The two different parts for the COC chip. A large reaction chamber and a channel containing mixing structures.

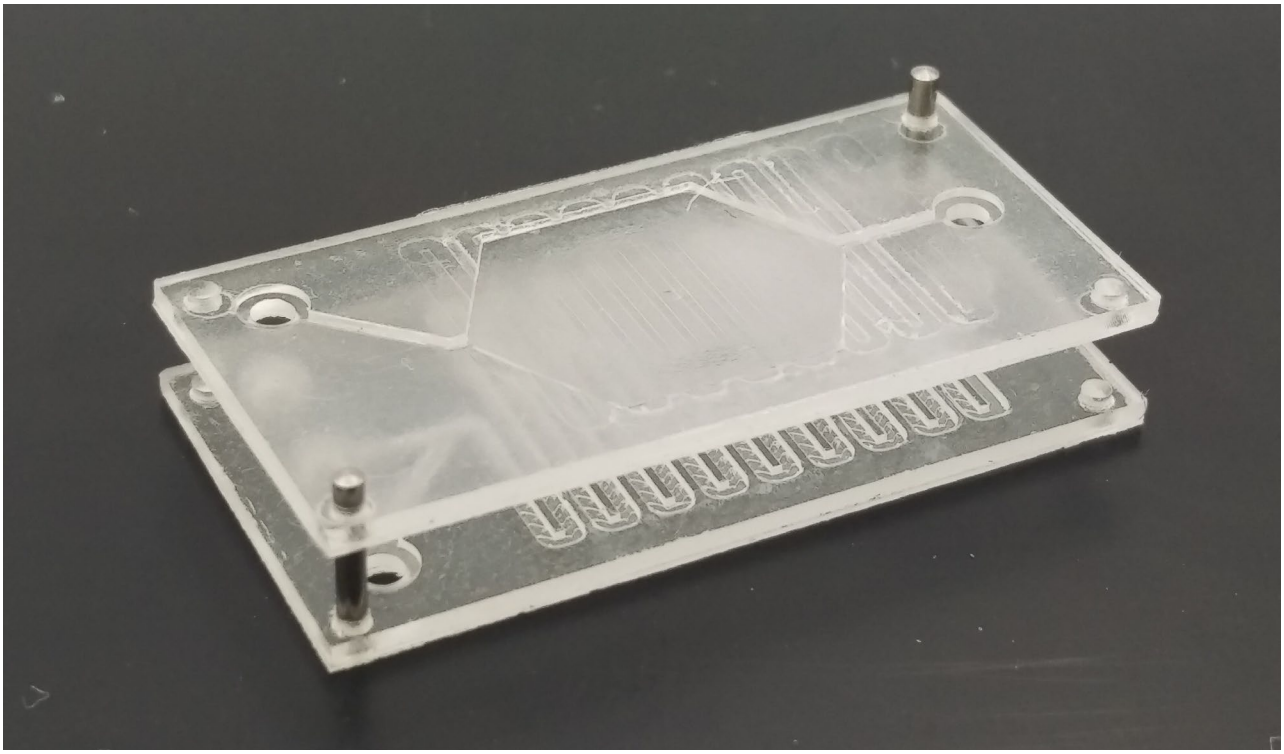

Fig. S3: Alignment of the two different COC parts with alignment pins. After aligning and bonding of the two parts the pins are removed from microfluidic chip.

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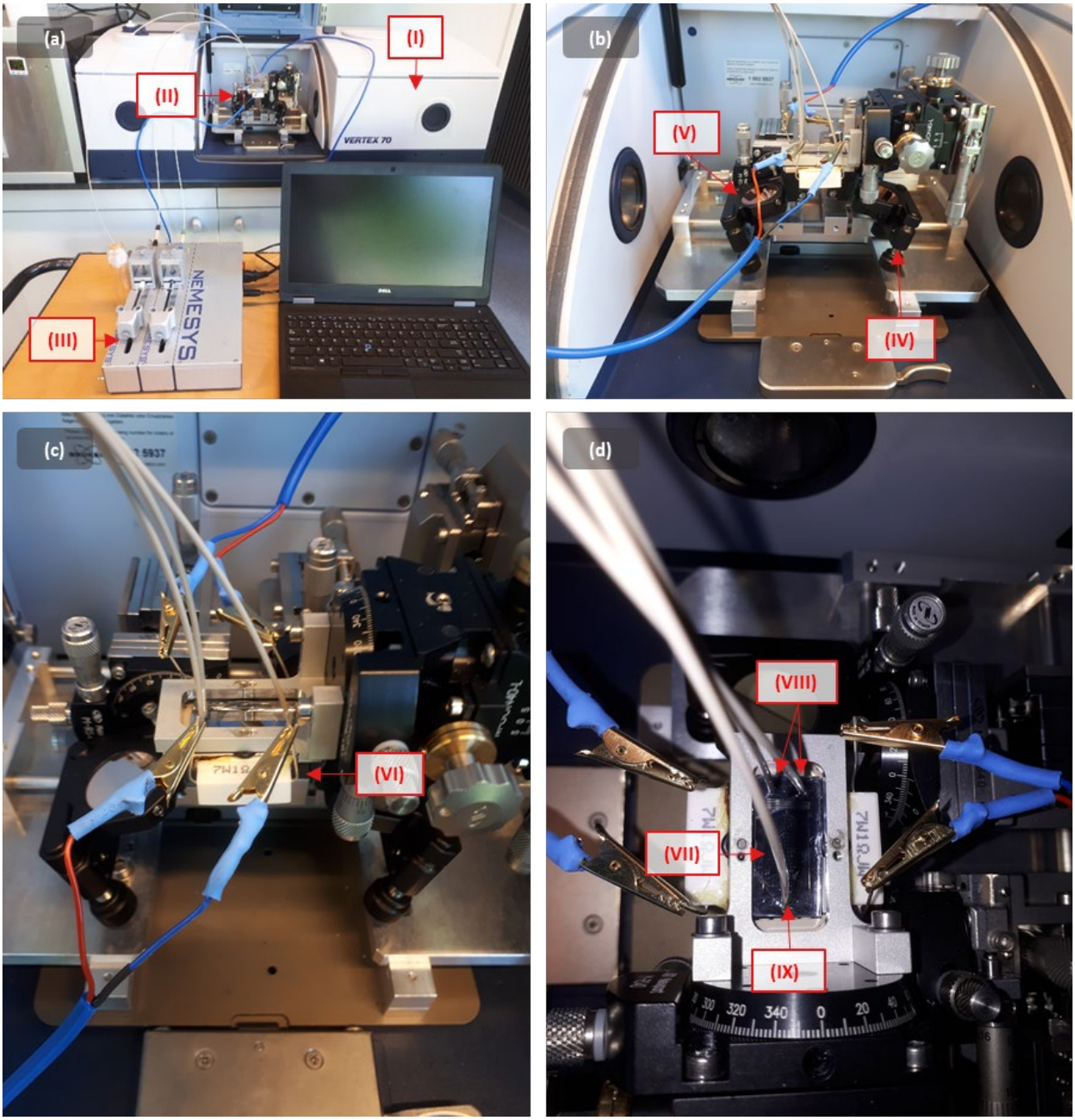

Fig. S4: Aligner used to align the fabricated chip with the Bruker Vertex 70 FTIR instrument. a) zoomed out view of the setup I: Bruker Vertex 70 FTIR instrument. II: alignment tool III: Nemesys syringe pump. b) zoomed in view on the aligner tool. Several micro stages are visible to move the chip in X, Y, Z, direction and adjust the pitch and roll of the chip. Adjustments can also be made to the in X, Y, Z, direction of the mirrors as well as the roll axis of the mirror. IV: mirror for coupling the light into the IRE device. V: mirror for coupling the light exiting the chip into the FTIR instrument. c) zoom in on the chip holder. VI: resistors that can be used to heat the chip, not used for the current study. d) zoom in on the chip. VII: the microfluidic chip. VIII: the two inlets connected to the chip. IX: the outlet connecting the chip with the waste container.

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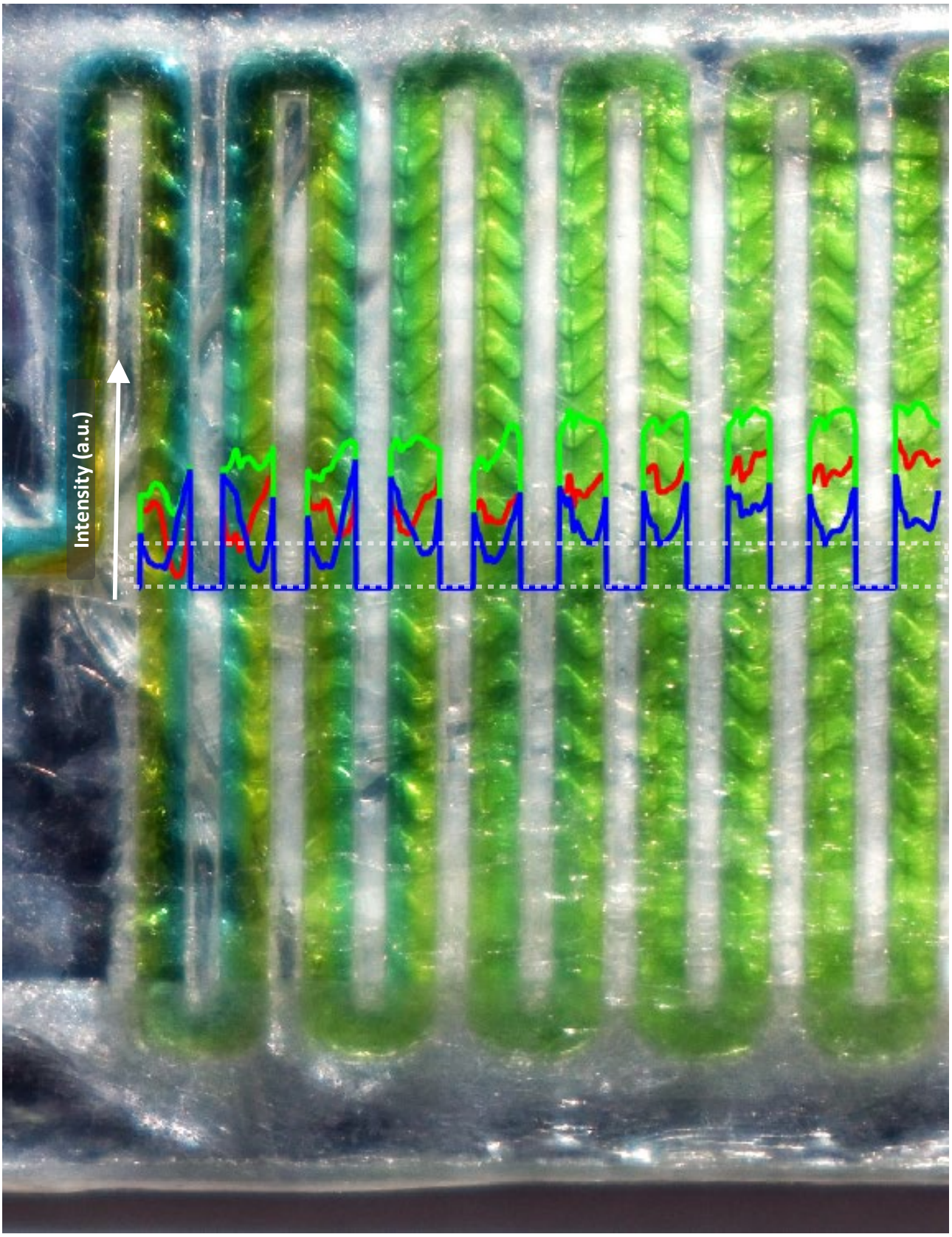

Fig. S5: Colour analysis of the dyes in the COC chip. Each point averaged over 50 point in the y directions, indicated by the white dotted line . Both visually and based on the RGB values, separation can be observed till channel 6. Based on the RGB value, separation might still be present in channel 7 and 8. But it is clear that total mixing has occurred by the time liquid reaches channel 9.

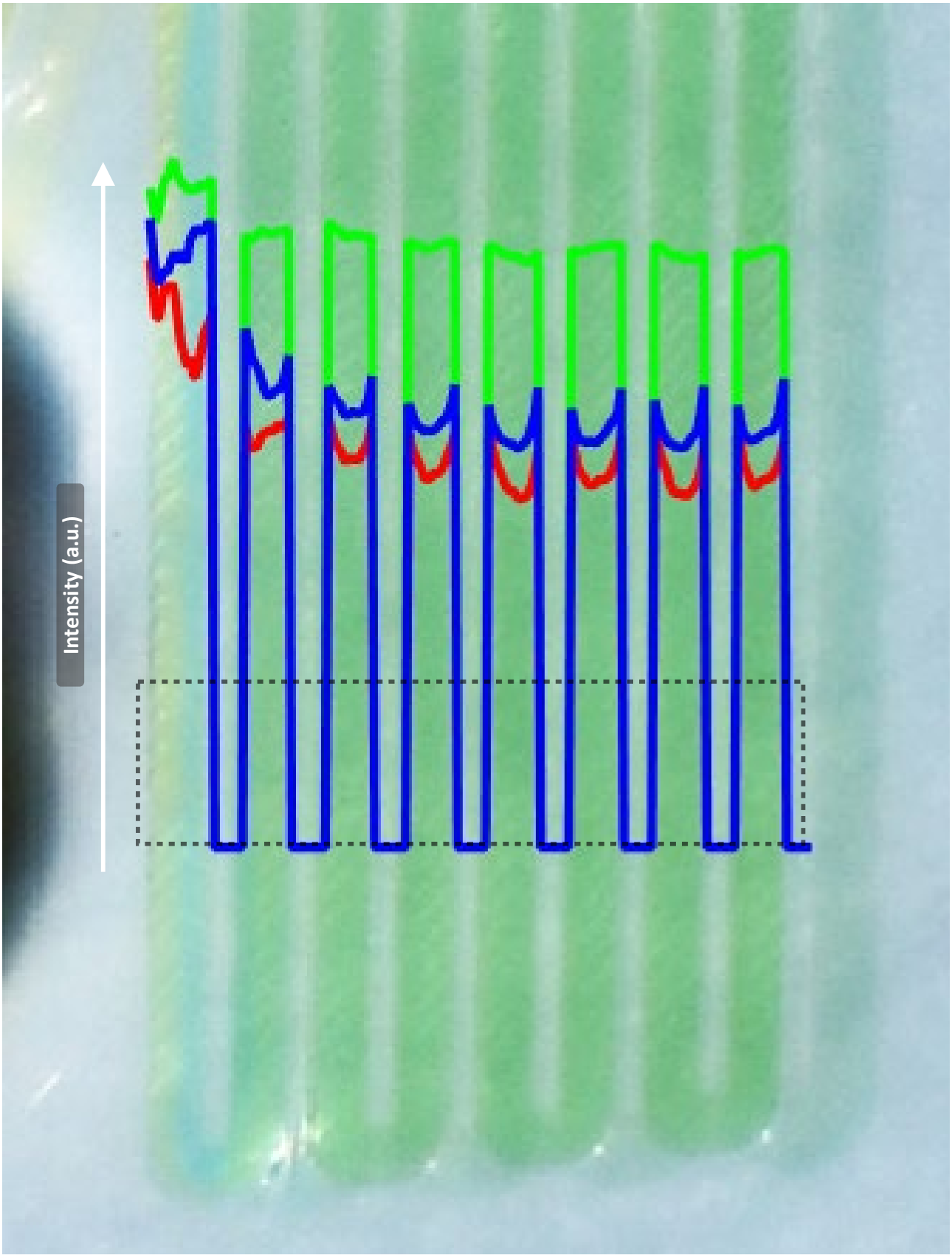

Fig. S6: Colour analysis of the dyes in the PDMS chip. Each point averaged over 50 point in the y directions, indicated by the white dotted line . Both visually and based on the RGB values, separation can be observed till channel 2. Based on the RGB value and visual observation total mixing has occurred by the time liquid reaches channel 3.

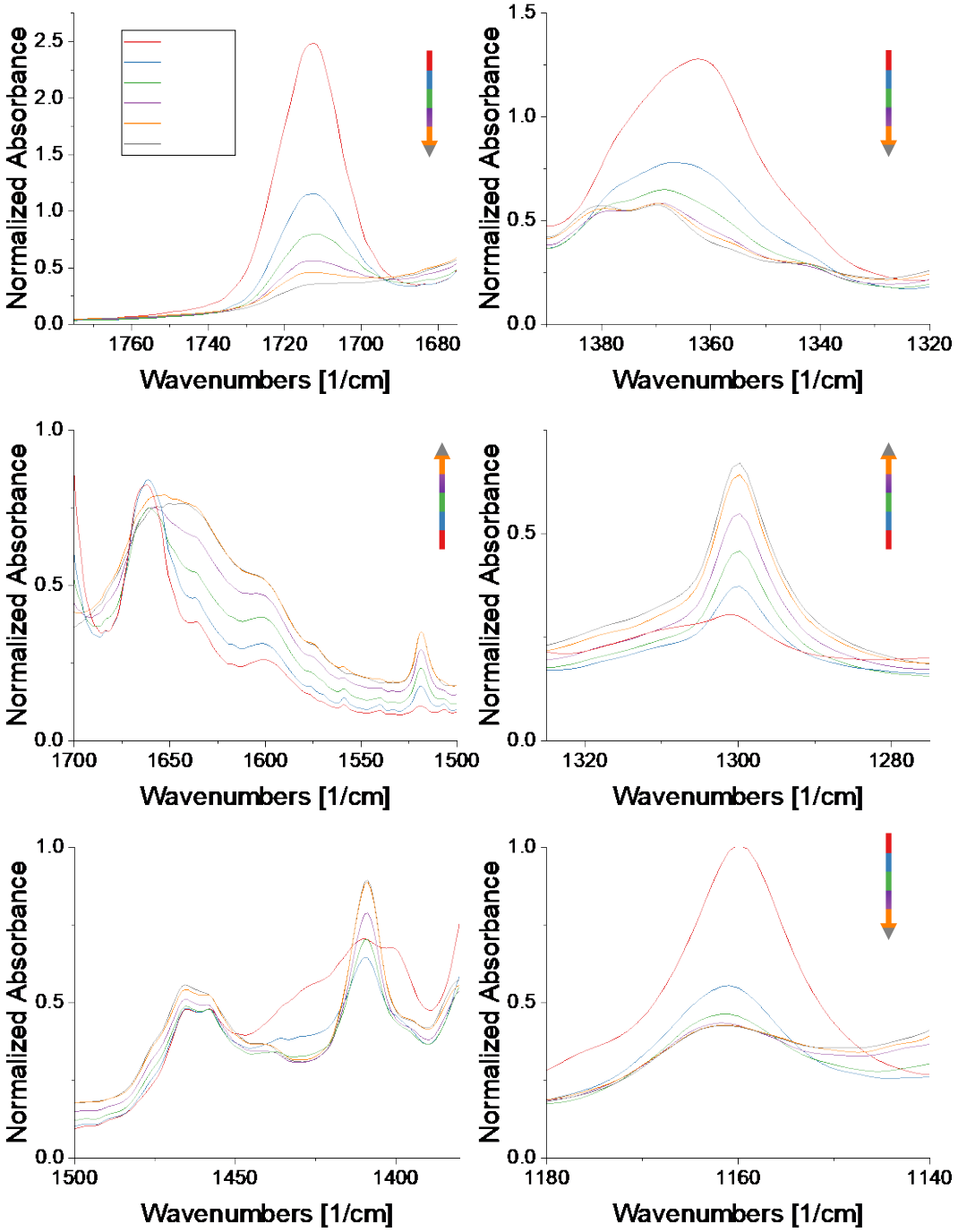

Fig. S7: Zoomed in line spectra of the Paal-Knorr reaction