## Electronic Supplementary Material (ESI) for Soft Matter. This journal is © The Royal Society of Chemistry 2015

1

## SUPPLEMENTARY INFORMATION

## Image analysis to measure the residual volume

In order to determine the volume  $V_r$  of residual droplets remaining at the nodes, images were analyzed as follows. On each picture, the profile of the droplet on the node is drawn by detecting the maximum gradient of the blue component on the picture. A typical profile is shown in the inset of Figure 1. The volume is calculated by integrating the profile around the horizontal fiber and by subtracting the volume of the fibers. The same method is applied on the vertical fiber. Therefore, the measured volume plotted on Figure 1 corresponds to the average of both measurements. The method has been checked with determined liquid quantities placed with a micropipette at the node. Figure 1 represents the measured volume as a function of the theoretical volume. The method has been calibrated and is found to be accurate with a relative error less than 10%. For the largest volumes, the droplets are off-center and therefore the image analysis overestimates their volumes. However, as the residual volumes are under 1  $\mu$ l, all the volumes are measured thanks to this method.



FIG. 1. Validation of the method developed in order the measure the volume of the residue. The volume of the droplet is measured by detecting its profile (see inset) and by its integration around the fiber. The measured volume is plotted as a function of the theoretical volume placed on the node. The method has been tested for three types of nodes and seems to be 10% accurate.

## Movies

Two movies are provided :

- M1 The movie presents the encapsulation/release of a microdroplet at a node. The movie, recorded with a fast video recorder (1000 fps), shows that the inner drop is dragged by the incoming oil, leading to detachment of a volume excess.
- M2 The movie shows the formation of four compound droplets. Each one corresponds to one of the four different combinations of three colors among four. As stated in the main text, the great advantage of fiber arrays is to explore various combinations within a unique device. The idea is to separate fibers in order to avoid node creation in the array. Therefore each incoming aqueous droplet leaves only three residues on the three nodes on each fiber. After rotating the device, the oil droplet collects the residues. At the end, the four different compound droplets are the four possible combinations of three colors among four.