Supplementary material for "One step generation of single-core double emulsions from polymer-osmose-induced aqueous phase separation in polar oil droplets"

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I. floating droplets - movie S1

A drop of 1-octanol (diameter 1 mm) containing PVPone is deposited on top of a solution of water and PVA. Instantaneously, water droplets get incorporated in this oil drop. The largest water drop is located in the center and is not moving, while smaller ones are circulating around. The origin of this circulation is that - in this setup which includes an interface with air - evaporation of 1-octanol occurs. This evaporation induces gradients of temperature and of surface tension: a toroidal Marangoni flow is then ignited, and the small water drops get trapped in this flow, eventually acting as tracers of this evaporation-induced flow. The flow remains symmetric, so that no effective motion of the oil drop is detected (see ref. 52 of the article).

II. pH-induced transition from multiple-core to single-core double emulsion - movie S2

A double emulsion is produced as described in the main text, with PEG and a carboxyl derivative of PNIPAM in 1-octanol mixed to a basic solution of PVA. In these conditions, a multiple-core double emulsion is formed. When adding HCl on the microscopy slide to reduce the pH, we observe a transition to single-core double emulsion, as the inner water droplets coalesce within the oil droplets.

III. pH-induced transition from multiple core to singe core : concentrated double emulsion - movie S3

The movie shows the same behavior as for movie S2, except that the emulsion is initially more concentrated in oil. HCl is added on the right of the image and the transition from multiple core to single core then propagates with time from right to left.