

Fabrication of polymeric microcapsules in a microchannel using formation of double emulsion

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This paper describes simple method for synthesis of monodisperse microcapsules in microchannel based on flow focusing. In comparison with conventional method requiring complex surface treatment in microchannel with two junctions, this method can easily generate double emulsions with high monodispersity in the microfluidic device having single junction. We use FC-77 oil and photocurable ethoxylated trimethylolpropane triacrylate (ETPTA) as a disperse fluid and 3 wt% poly(vinyl alcohol) (PVA) aqueous solution as a continuous fluid. The double emulsion droplets are transformed into microcapsules under photopolymerization. In addition, we control thickness of double emulsion of shell by varying the flow rate of ETPTA. Also, we confirm capability of total size of double emulsion, depending on manipulation of flow rate of continuous fluid. We envision that this method can provide a simple route for synthesizing monodisperse microcapsules which can be possible application of drug delivery system.