Abstract Submitted for the MAR17 Meeting of The American Physical Society

On-Chip generation of polymer microcapsules through droplet coalescence MD DANISH EQBAL, VENKAT GUNDABALA, Department of Chemical engineering, Indian Institute of Technology Bombay, GUNDABALA LAB TEAM — Alginate microbeads and microcapsules have numerous applications in drug delivery, tissue engineering and other biomedical areas due to their unique properties. Microcapsules with liquid core are of particular interest in the area of cell encapsulation. Various methods such as coacervation, emulsification, micronozzle, etc. exist for the generation of microbeads and microcapsules. However, these methods have several drawbacks like coagulation, non-uniformity, and polydispersity. In this work we present a method for complete on chip generation of alginate microcapsules (single core as well as double core) through the use of droplet merging technique. For this purpose, a combined Coflow and T-junction configuration is implemented in a hybrid glass-PDMS (Polydimethylsiloxane) microfluidic device. Efficient generation is achieved through precise matching of the generation rates of the coalescing drops. Through this approach, microcapsules with intact single and double (liquid) cores surrounded by alginate shell have been successfully generated and characterized.

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Date submitted: 04 Nov 2016

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