

In situ microfluidic method for the generation of monodisperse alginate microgel

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Alginate which is one of the hydrogels is attractive due to their nontoxicity, biodegradability, and can be made from a rapid preparation method. In particular, spherical monodisperse alginate microgels are attractive materials for detection, monitoring, prediction, and modeling of biomolecular behavior, as they show an expected response to external stimuli. There is a great need for a production methodology to generate monodispersed alginate microgels.

Herein we present simple method for generation of monodisperse alginate microgel in microfluidic device. The capillary number(Ca) and the flow rate of the aqueous phase which are important parameters are mainly influenced the formation of three distinctive flow regimes, such as droplets, elongation, and unstable. Also, it can be easily modulated by varying the flow rate, viscosity, and interfacial tension. This simple microfluidic method for the generation of monodisperse alginate and encapsulation of biomolecules shows strong potential for use in biosensors, cell sensors, drug delivery systems, and cell transplantation applications.