

## Biocompatible Microcapsules for Sustained and Sequential Delivery of Drugs

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Sustained and sequential delivery of multiple drugs to diseased part of patient body is very important for efficient treatment. However, conventional drug carriers are poorly designed and only provide a limited controllability over encapsulation and release profile. To overcome such limitations, we have designed biocompatible microcapsules using microfluidics. With a glass capillary device, water-in-oil-in-water (W/O/W) double-emulsion drops with ultra-thin middle layer are prepared as template to make microcapsules, where organic solution of biodegradable polymers is used as middle oil phase. Upon incubation of the double-emulsion drops, the organic solvent diffuses into the surrounding water phase and finally evaporates, thereby resulting in ultra-thin polymeric membrane enclosing the innermost water drops. The resultant microcapsules exhibit a long-term release of encapsulants in a course of degradation of the membrane. Moreover, the period of the release is determined by membrane thickness, thereby enabling the sequential release of multiple encapsulants from microcapsules with distinct membrane thickness.