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ABSTRACT

Synthetic polymeric biodegradable nanoparticles were produced by micromixing combined with nanoprecipitation in a co-flow glass capillary device consisted of coaxial assembly of glass capillaries, fabricated by aligning a tapered-end round capillary inside a square capillary with 1 mm internal dimension. Micromixing of water and organic phase (1 wt% polylactide or polycaprolactone dissolved in tetrahydrofuran) was modelled using a commercial software package Comsol Multiphysics™ and experimentally investigated using dynamic light scattering, Nanoparticle Tracking Analysis (NTA) and *in situ* microscopic observation. The organic phase was injected through a nozzle with a diameter of 60 μm at the organic-to-aqueous flow-rate ratios ranging from 1.5 to 10. The locations at which the nanoparticles would form were determined by using the solubility criteria of the polymer and the concentration profiles found by numerical modelling. The convective flux of the polymer in the radial direction was 2-3 orders of