3d-Printed Biocompatible Micromixer With Helical Blades For Viscous Fluids

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We report a 3D-printed micromixer embedded with helical blade structure that shows high performance to mix viscous fluids, PEG200 solutions as model liquids, in a cost-friendly and facile fabrication manner. High-viscosity fluids are often used in research when mimicking the intracellular environment. Such high-viscosity fluids, however, are difficult to mix: especially in a typical experiment using microchannel, the flow is laminar due to the low Reynold's number. In order to achieve sufficient mixing, turbulence has to be induced in the stream. Passive mixers with embedded structures are suitable to disturb the flow, but the main concerns include labor-intensive fabrication steps which take multiple steps and low reproducibility of the intricate structures. Here, we report a 3D-printed micromixer embedded with helical blade structure that shows high performance to mix viscous fluids, PEG200 solutions as model liquids, in a cost-friendly and facile fabrication manner. We have observed formation of laminar flow at the beginning of the mixing zone and completed the mixing at the end of the mixing zone. These first results show that efficient mixing of high-viscosity fluids can be achieved in a 3D-printed biocompatible micromixer with embedded helical structure.