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A simple and low-cost 3d-printed emulsion generator J. M. ZHANG, A. A. AGUIRRE-PABLO, E. Q. LI, S. T. THORODDSEN, King Abdullah University of Science and Technology — The technique traditionally utilized to fabricate microfluidic emulsion generators, i.e. soft-lithography, is complex and expensive for producing three-dimensional (3D) structures. Here we apply 3D printing technology to fabricate a simple and low-cost 3D printed microfluidic device for emulsion generation without the need for surface treatment on the channel walls. This 3D-printed emulsion generator has been successfully tested over a range of conditions. We also formulate and demonstrate uniform scaling laws for emulsion droplets generated in different regimes for the first time, by incorporating the dynamic contact angle effects during the drop formation. Magnetically responsive microspheres are also produced with our emulsion templates, demonstrating the potential applications of this 3D emulsion generator in material and chemical engineering.

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