Abstract

Additive manufacturing processes such as 3D printing use time-consuming, stepwise layer-by-layer approaches in object fabrication. Continuous generation of monolithic polymeric parts up to tens of centimeters in size with feature resolution below 100 micrometers is demonstrated using Continuous liquid interface production (CLIP). CLIP is achieved with an oxygen-permeable window below the ultraviolet image projection plane, which creates a “dead zone” (persistent liquid interface) where photo-polymerization is inhibited between the window and the polymerizing part. Critical control parameters are delineated and complex solid parts are drawn out of the resin at rates of hundreds of millimeters per hour. These print speeds allow parts to be produced in minutes instead of hours.