CLAIMS:

1. A method of forming a three-dimensional object, comprising:

providing a carrier and an optically transparent member having a build surface, said carrier and said build surface defining a build region therebetween;

filling said build region with a polymerizable liquid, said polymerizable liquid comprising a mixture of (i) a light polymerizable liquid first component, and (ii) a second solidifiable component that is different from said first component,

intermittently irradiating said build region with light through said optically transparent member to form a solid polymer from said polymerizable liquid first component,

continuously or intermittently advancing said carrier away from said build surface to form said three-dimensional object from said solid polymer,

wherein said intermittently irradiating comprises alternating periods of active and inactive illumination, wherein the average duration of the periods of active illumination is less than the average duration of the periods of inactive illumination, and

concurrently with or following the forming of said solid polymer, solidifying and/or curing said second solidifiable component to form said three-dimensional object, wherein:

(a) said solidifying and/or curing step is carried out concurrently with said irradiating step and:

(i) said solidifying and/or curing step is carried out by precipitation; or

(ii) said irradiating step generates heat from the polymerization of said first component in an amount sufficient to thermally solidify or polymerize said second solidifiable component; and/or

(b) said solidifying and/or curing step is carried out subsequent to said irradiating step and is carried out by:

(i) heating said second solidifiable component;

(ii) irradiating said second solidifiable component with light at a wavelength different from that of the light in said irradiating step;

(iii) contacting said second solidifiable component to water; and/or

(iv) contacting said second solidifiable component to a catalyst.

2. The method of claim 1, wherein said filling step further comprises vertically reciprocating said carrier with respect to said build surface to enhance or speed the refilling of said build region with said polymerizable liquid.

3. The method of claim 1 or 2, wherein said filling, irradiating, and/or advancing steps are carried out while also concurrently:

(i) continuously maintaining a dead zone of polymerizable liquid in contact with said build surface, and

(ii) continuously maintaining a gradient of polymerization zone between said dead zone and said solid polymer and in contact with each thereof, said gradient of polymerization zone comprising said polymerizable liquid first component in partially cured form.

4. The method of any preceding claim, wherein said build surface is fixed and stationary in the lateral (X and Y) dimensions.

5. The method of any preceding claim, wherein said advancing is carried out at a cumulative rate of at least 0.1, 1, 10, 100 or 1000 microns per second.

6. The method of claim 3 to 5, wherein said optically transparent member comprises a semipermeable member, and said continuously maintaining a dead zone is carried out by feeding an inhibitor of polymerization through said optically transparent member in an amount sufficient to maintain said dead zone and said gradient of polymerization.

7. The method of any preceding claim, wherein said optically transparent member is comprised of a semipermeable polymer.

8. The method of claim 3 to 7, wherein at least one of:

said gradient of polymerization zone and said dead zone together have a thickness of from 1 to 1000 microns; and/or

wherein said gradient of polymerization zone is maintained for a time of at least 5, 10, 20, or 30 seconds, or at least 1 or 2 minutes.

9. The method of any preceding claim, further comprising the step of heating said polymerizable liquid to reduce the viscosity thereof in said build region.

10. The method of claim 6 to 9, wherein:

said polymerizable liquid comprises a free radical polymerizable liquid and said inhibitor comprises oxygen; or

said polymerizable liquid comprises an acid-catalyzed or cationically polymerizable liquid, and said inhibitor comprises a base.

11. The method of any preceding claim, wherein said second solidifiable component comprises a polymerizable liquid solubilized in or suspended in said first component.

12. The method of any preceding claim, wherein said three-dimensional object comprises a polymer blend, interpenetrating polymer network, semi-interpenetrating polymer network, or sequential interpenetrating polymer network formed from said first component and said second solidifiable component.

13. The method of any preceding claim, wherein said solidifying and/or curing step is carried out concurrently with said irradiating step and:

(i) said solidifying and/or curing step is carried out by precipitation; or

(ii) said irradiating step generates heat from the polymerization of said first component in an amount sufficient to thermally solidify or polymerize said second solidifiable component.

14. The method of any preceding claim, wherein said solidifying and/or curing step is carried out subsequent to said irradiating step and is carried out by:

(i) heating said second solidifiable component;

(ii) irradiating said second solidifiable component with light at a wavelength different from that of the light in said irradiating step;

(iii) contacting said second solidifiable component to water; and/or

(iv) contacting said second solidifiable component to a catalyst.

15. The method of any preceding claim, wherein: said second solidifiable component comprises the precursors to a polyurethane, polyurea, or copolymer thereof, a silicone resin, an epoxy resin, a cyanate ester resin, or a natural rubber; and said solidifying and/or curing step is carried out by heating and/or microwave irradiating.

16. The method of any preceding claim, wherein:

said solidifying and/or curing step is carried out subsequent to said irradiating step; and

said solidifying and/or curing step is carried out under conditions in which said solid polymer degrades and forms a constituent necessary for the polymerization of said second solidifiable component.

17. The method of any preceding claim, wherein:

said first component comprises monomers and/or prepolymers that can be polymerized by exposure to actinic radiation or light; and

said second solidifiable component is solidifiable on contacting to heat, water, water vapor, light at a different wavelength than that at which said first component is polymerized, catalysts, evaporation of a solvent from the polymerizable liquid, exposure to microwave irradiation, and combinations thereof.