CLAIMS

What is claimed is:

1. A method for self-assembly of magnetic building blocks, the method comprising:

distributing a plurality of building blocks in a liquid medium, each of the plurality of building blocks comprising a plurality of stable radicals;

establishing a magnetic field interacting with at least a portion of the plurality of building blocks;

guiding with the magnetic field the portion of the plurality of building blocks from a first location in the liquid medium to a second location in the liquid medium;

assembling into a first construct the portion of the plurality of building blocks proximate the second location; and

treating the first construct with at least one antioxidant to neutralize at least in part the plurality of stable radicals.

2. The method of claim 1, further including incubating the plurality of building blocks in a composition comprising the plurality of stable radicals.

3. The method of claim 1, wherein the step of assembling into the construct the portion of the plurality of building blocks further including cross-linking together each of the building blocks that comprise the first construct.

4. The method of claim 1, wherein the plurality of building blocks comprises at least one of nucleic acids, proteins, cells, and tissues.

5. The method of claim 1, wherein the plurality of building blocks is essentially free of iron, nickel, and cobalt.

6. The method of claim 1, wherein the density of each of the plurality of building blocks is less than the density of the liquid medium such that the plurality of building blocks floats on a surface of the liquid medium.

7. The method of claim 1, wherein the plurality of building blocks includes at least a first fraction of building blocks having a first density and a second fraction of building blocks having a second density different from the first density such that there is a differential in buoyancy between the first fraction and the second fraction.

8. The method of claim 1, further including:

submerging the first construct in a first liquid phase;

forming a second liquid phase on top of the first liquid phase;

assembling a second construct comprising at least a second portion of the plurality of building blocks, the second construct assembled in the second liquid phase relatively above the first construct; and

displacing at least one of the first liquid phase and the second liquid phase, thereby layering the second construct on the first construct to form a three dimensional structure.

9. The method of claim 1, wherein the liquid medium includes a surfactant to decrease the surface tension and drag forces on the plurality of building blocks.

10. The method of claim 1, wherein the plurality of building blocks comprising the plurality of stable radicals is paramagnetic.

11. A system for self-assembly of magnetic building blocks, the system comprising:

a liquid medium;

a reservoir for containing the liquid medium;

a plurality of building blocks for distribution in the liquid medium, each of the plurality of building blocks comprising a plurality of stable radicals;

a magnetic field established relative to the reservoir, the magnetic field interacting with at least a portion plurality of building blocks when the plurality of building blocks are distributed in the liquid medium, the magnetic field operable to guide the portion of the plurality of building blocks from a first location in the liquid medium to a second location in the liquid medium and assemble into a first construct the portion of the plurality of building blocks proximate the second location; and

a composition comprising an antioxidant for treating the first construct to neutralize at least in part the plurality of stable radicals.

12. The system of claim 11, wherein the liquid medium includes a surfactant to decrease the surface tension and drag forces on the plurality of building blocks.

13. The system of claim 11, wherein the plurality of building blocks comprises at least one of nucleic acids, proteins, cells, and tissues.

14. The system of claim 11, wherein the plurality of building blocks is essentially free of iron, nickel, and cobalt.

15. The system of claim 11, wherein the density of each of the plurality of building blocks is less than the density of the liquid medium such that the plurality of building blocks floats on a surface of the liquid medium.

16. The system of claim 11, wherein the plurality of building blocks includes at least a first fraction of building blocks having a first density and a second fraction of

building blocks having a second density different from the first density such that there is a differential in buoyancy between the first fraction and the second fraction.

17. The system of claim 11, further including a permanent magnet for establishing the magnetic field.

18. The system of claim 11, wherein the plurality of building blocks comprising the plurality of stable radicals is paramagnetic.

19. The system of claim 11, further comprising at least one ultraviolet light source for cross-linking the portion of the plurality of building blocks that comprises the first construct.

20. A method for self-assembly of magnetic building blocks, the method comprising:

incubating a plurality of building blocks in a composition comprising a plurality of stable radicals;

distributing the plurality of building blocks in a reservoir containing a liquid medium;

establishing a magnetic field with a permanent magnet, the magnetic field encompassing at least a portion of the plurality of building blocks;

guiding with the magnetic field the portion of the plurality of building blocks from a first location in the liquid medium to a second location in the liquid medium;

assembling into a first construct the portion of the plurality of building blocks proximate the second location;

cross-linking the portion of the plurality of building blocks that comprises the first construct; and

treating the first construct with at least one antioxidant to neutralize at least in part the plurality of stable radicals;

wherein the density of each of the plurality of building blocks is less than the density of the liquid medium such that the plurality of building blocks floats on a surface of the liquid medium.