What is claimed is:

CLAIMS

1. A composition suitable for forming gas microspheres for diagnostic and/or therapeutic use, comprising

a lipid solution comprising about 0.1 mg to about 0.6 mg combined of DPPA, DPPC and PEG5000-DPPE per ml of solution, and

a perfluorocarbon gas, in a container,

wherein when activated the composition comprises microspheres having an average diameter of about 1 micron to about 2 microns,

optionally wherein when activated the composition comprises about 0.1×10^9 to about 3.5×10^9 microspheres per mL.

2. A composition of gas microspheres for diagnostic and/or therapeutic use, comprising

lipid-encapsulated gas microspheres having an average diameter ranging from about 1.0 micron to about 2.0 microns in a mixture of a lipid solution and a perfluorocarbon gas in a container, wherein the lipid solution comprises about 0.1 to about 0.6 mg DPPA, DPPC and PEG5000-DPPE (combined) per ml of solution,

optionally wherein the composition comprises about 0.1×10^9 to about 3.5×10^9 microspheres per mL.

3. The composition of claim 1, wherein the microspheres have an average diameter ranging from about 1.2 microns to about 1.8 microns optionally wherein the microspheres have an average diameter of about 1.6 microns.

4. The composition of claim 1 or 3, wherein at least 50% of the microspheres have a diameter of about 1.0 to about 2.0 microns, optionally wherein at least 70% of the microspheres have a diameter of about 1.0 to about 2.0 microns.

5. The composition of any one of claims 1, 3 and 4, wherein the lipid solution comprises DPPA, DPPC and PEG5000-DPPE in a mole % ratio of 10:82:8.

6. The composition of any one of claims 1 and 3-5, wherein the PEG500-DPPE is MPEG5000-DPPE.

7. The composition of any one of claims 1 and 3-6, wherein the perfluorocarbon gas is perfluoropropane.

8. The composition of any one of claims 1 and 3-7, wherein the lipid solution further comprises propylene glycol, glycerol, and saline, optionally wherein the lipid solution further comprises propylene glycol, glycerol, buffer, and saline, further optionally wherein the lipid solution further comprises propylene glycol, glycerol, phosphate buffer, and saline.

9. The composition of any one of claims 1 and 3-8, wherein the lipid solution further comprises saline, glycerol and propylene glycol in a weight ratio of 8:1:1.

10. The composition of any one of claims 1 and 3-9, comprising about 1.76 ml lipid solution and about 2.03 ml of perfluorocarbon gas.

11. The composition of any one of claims 1 and 3-10, wherein the lipid solution comprises about 0.2 to about 0.5 mg of lipids per ml of solution, optionally wherein the lipid solution comprises about 0.3 to about 0.4 mg of lipids per ml of solution, further optionally wherein the lipid solution comprises about 0.4 to about 0.5 mg of lipids per ml of solution.

12. The composition of any one of claims 1 and 3-11, wherein the container is a vial, a tube, or a syringe.

13. The composition of any one of claims 1 and 3-12, wherein the container is a rubber-less container, a plastic container, or a rubber-less plastic container.

14. The composition of any one of claims 1 and 3-13, wherein the container is (a) a plastic syringe having a rubber-less plunger, (b) a plastic syringe having a substantially flat-end plunger, (c) plastic syringe having a rubber-less and substantially flat-end plunger, or (d) a glass container having a v-shaped bottom.

15. The composition of any one of claims 1 and 3-14, wherein the container has an actual internal volume of less than 3 mL, and wherein the perfluorocarbon gas occupies about 50 to about 55% of the actual internal volume.

16. The composition of claim 15, wherein the actual internal volume is in the range of 1 mL to less than 3 mL.

17. A method for producing gas microspheres for diagnostic and/or therapeutic use, comprising

activating the composition of any one of claims 1 and 3-14 to form a population of lipid-encapsulated microspheres.

18. The method of claim 17, wherein the composition is activated for less than 1 minute, optionally wherein the composition is activated for about 20 to about 50 seconds.