

CLAIMS:

1. A method for manufacturing particles, comprising:
preparing a lipid compound;
combining a perfluorocarbon with the liquid compound; and
agitating the combination.
2. The method of claim 1, further comprising agitating the combination by one or more of centrifugation, sonication, homogenization or mechanical agitation.
3. The method of claim 1, further comprising agitating the combination to achieve a predetermined particle size distribution.
4. The method of claim 3, wherein the particle size distribution is in a range of from about 400 nm to about 300 microns.
5. The method of claim 1, further comprising combining different lipids in a sequence based on a characteristic of each lipid to prepare the lipid compound.
6. The method of claim 5, further comprising:
preparing a solution with a lipid solvent;
heating the solution; and
adding the different lipids to the solution in order of solubility.
7. The method of claim 1, wherein the lipid compound comprises one or more of DPPA, DPPC, DSPC, PEG40 Stearate, DSPE-mPEG(2000), DSPE-PEG(2000)-Biotin, DSPE-PEG-5000-Biotin, DSPE-PEG(2000)-Desthiobiotin, PBS buffer, glycerol, propyleneglycol, or DSPE-PEG(2000)-Maleimide.
8. The method of claim 1, wherein the perfluorocarbon is one or more of perfluoropentane, perfluorohexane, perfluorooctane, perfluorooctyl bromide, perfluorodichlorooctane, or perfluorodecalin.

9. The method of claim 1, further comprising functionalizing the particle with a linker.
10. The method of claim 9, wherein the linker is reversible.
11. The method of claim 9, wherein the linker comprises one or more of Avidin, Neutravidin, Streptavidin, Captavidin, biotin, desthiobiotin, an antibody, an aptamer or an oligomer.
12. The method of claim 1, further comprising applying a stabilizer or surfactant to the particles.
13. A particle manufactured according to any of claims 1-12.
14. A particle for use in cell selection, comprising:
 - a perfluorocarbon core; and
 - a lipid shell that covers at least a portion of the core;wherein the lipid shell is functionalized with a linker.
15. The particle of claim 14, further comprising a plurality of the particles, wherein the particle size distribution of the particles is in a range of from about 400 nm to about 300 microns.
16. The particle of claim 14, wherein the lipid shell further comprises a combination of different lipids.
17. The particle of claim 16, wherein the lipid shell comprises one or more of DPPA, DPPC, DSPC, PEG40 Stearate, DSPE-mPEG(2000), DSPE-PEG(2000)-Biotin, DSPE-PEG-5000-Biotin, DSPE-PEG(2000)-Desthiobiotin, PBS buffer, glycerol, propyleneglycol, or DSPE-PEG(2000)-Maleimide.
18. The particle of claim 14, wherein the perfluorocarbon core comprises one or more of perfluoropentane, perfluorohexane, perfluorooctane, perfluorooctyl bromide, perfluorodichlorooctane, or perfluorodecalin.
19. The particle of claim 14, wherein the linker comprises one or more of Avidin, Neutravidin, Streptavidin, Captavidin, biotin, desthiobiotin, an antibody, an aptamer or an oligomer.

20. The particle of claim 14, further comprising a stabilizer or surfactant.

21. A method for separating target particles from a fluid, comprising:
receiving functionalized particles of claim 14 in the fluid in a chamber;

receiving target particles in the chamber;

permitting the target particles to bind with the functionalized particles;

applying an acoustic wave to the chamber to influence the functionalized particles to be collected or blocked by the acoustic wave.