CLAIMS

WHAT IS CLAIMED IS:

1. A composition comprising a plurality of first surfactant molecules comprising a tail portion and a head portion, wherein the first surfactant molecules comprise an average of 2-10 of a first linkage moiety per surfactant molecule wherein the first linkage moieties are configured to either
(i) link with each other under suitable conditions,
(ii) to link with a second linkage moiety under suitable conditions, wherein the second linkage moiety is attached to a second surfactant molecule comprising a tail portion and a head portion, and wherein the second linkage moiety is different from the first linkage moiety, or
(iii) to link with an intermediate linkage moiety under suitable conditions, or a combination thereof.

2. The composition of claim 1 further comprising a continuous phase containing the first surfactant molecules and/or the second surfactant molecules and a dispersed phase, wherein the dispersed phase does not contain the first and/or second surfactant molecules and, optionally, does contain the intermediate moiety linkage.

3. The composition of claim 1 further comprising a dispersed phase containing the first surfactant molecules and/or the second surfactant molecules, and a continuous phase, wherein the continuous phase does not contain the first and/or second surfactant molecules and, optionally, does contain the intermediate linkage moiety.

4. The composition of any of claims 1 through 3 wherein the surfactant moieties comprise the first linkage moiety comprising biotin and the intermediate linkage moieties comprising one or more biotin-binding moieties comprising streptavidin or a streptavidin derivative.

5. The composition of any one of claims 2 through 4 wherein the continuous phase comprises a fluorinated oil and the surfactant is a fluorosurfactant.

6. A composition comprising an emulsion comprising partitions of a dispersed phase in a continuous phase, wherein the partitions of the dispersed phase comprise a plurality of surfactant molecules comprising a tail portion and a head portion that are situated at the interface of the partitions with the continuous phase to form a layer of surfactant molecules, and wherein the plurality of surfactant molecules are cross-linked to each other to form a cross-linked network of surfactant molecules.

7. The composition of claim 6 wherein the degree of cross-linking of the cross-linked network of surfactant molecules is 20-100% and the cross-linking is via cross links having an average length of 5-500% of the length of the tail portion of the surfactant.

8. The composition of claim 6 or claim 7 wherein a first portion of the surfactant molecules comprise a first linkage moiety that forms part of the cross-links, and wherein the average number of first linkage moieties per surfactant molecule is 2-10.

9. The composition of any of claims 6-9 wherein a second portion of the surfactant molecules comprise a second linkage moiety, different from the first linkage moiety, that forms part of the cross-links, and wherein the average number of second linkage moieties per surfactant molecule is 2-10.

10. The composition of any of claims 6-9 wherein the surfactant molecules are cross-linked via cross-links where the average length of the cross-links is 1-100 nm.

11. The composition of any of claims 6-10 wherein the dispersed phase comprises an aqueous phase, the continuous phase comprises a fluorinated oil and the surfactant comprises a fluorosurfactant.

12. The composition of any of claims 6-11 wherein the surfactant molecules comprise biotin moieties that are cross-linked by biotin-binding moieties comprising streptavidin or a streptavidin derivative.

13. The composition of claim 12 wherein the surfactant molecules comprise an average of 2-10 biotin moieties per surfactant molecule.

14 A method of conducting a process in an emulsion of partitions of a dispersed phase in a continuous phase, comprising

(i) providing the emulsion of partitions of dispersed phase in continuous phase, wherein the partitions of the dispersed phase comprise a plurality of surfactant molecules comprising a tail portion and a head portion that are situated at an interface of the partitions with the continuous phase to form a layer of surfactant molecules, and wherein the plurality of surfactant molecules are cross-linked to each other to form a cross-linked network of surfactant molecules; and

(ii) performing the process on the partitions.

15. The method of claim 14 wherein the degree of cross-linking of the cross-linked network of surfactant molecules is 20-100% and the cross links have an average length of 5-500% of the length of the tail portion of the surfactant.

16. The method of claim 14 or claim 15 wherein the surfactant molecules are cross-linked via cross-links, and where the average length of the cross-links is 1-100 nm.

17. The method of any of claims 14-16 wherein the dispersed phase is an aqueous phase , the continuous phase is a fluorinated oil, and the surfactant comprises a flurosurfactant.

18. The method of any of claims 14-17 wherein the surfactant molecules are cross-linked by biotin-biotin binding moiety interactions, wherein the biotin-binding moieties comprise streptavidin or a streptavidin derivative.

19. The method of claim 18 wherein the surfactant molecules comprise an average of 2-10 biotin moieties per surfactant molecule.

20. A method for producing an emulsion of partitions of dispersed phase in continuous phase, wherein the partitions of the dispersed phase comprise a plurality of surfactant molecules comprising a tail portion and a head portion that are situated at an interface of the partitions with the continuous phase to form a layer of surfactant molecules, comprising

(i) contacting continuous phase with a dispersed phase, wherein either

(a) the continuous phase comprises a plurality of surfactant molecules that comprise at least one linkage moiety, or

(b) the dispersed phase comprises a plurality of surfactant molecules that comprise at least one linkage moiety, or

(c) both (a) and (b)

under conditions wherein the dispersed phase forms a plurality of partitions in the continuous phase; and

(ii) providing conditions during and/or after the formation of the partitions that initiate and/or promote formation of cross-links between surfactant molecules comprising the linkage moieties, to form a cross-linked network of surfactant molecules.

21. The method of claim 20 wherein the continuous phase comprises surfactant molecules comprising linkage moieties and the dispersed phase does not.

22. The method of claim 20 or claim 21 wherein the conditions and/or number of linkage moieties are such that the degree of completion of the cross-linked network of surfactant molecules is 20-100%.