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(54) **FLUOROCARBON EMULSION STABILIZING SURFACTANTS**

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(57) **ABSTRACT**

Surfactants (e.g., fluorosurfactants) for stabilizing aqueous
or hydrocarbon droplets in a fluorophilic continuous phase
are presented. In some embodiments, fluorosurfactants
include a fluorophilic tail soluble in a fluorophilic (e.g.,
fluorocarbon) continuous phase, and a headgroup soluble in
either an aqueous phase or a lipophilic (e.g., hydrocarbon)
phase. The combination of a fluorophilic tail and a head-
group may be chosen so as to create a surfactant with a
suitable geometry for forming stabilized reverse emulsion
droplets having a disperse aqueous or lipophilic phase in a
continuous, fluorophilic phase. In some embodiments, the
headgroup is preferably non-ionic and can prevent or limit
the adsorption of molecules at the interface between the
surfactant and the discontinuous phase. This configuration
can allow the droplet to serve, for example, as a reaction site
for certain chemical and/or biological reactions. In another
embodiment, aqueous droplets are stabilized in a fluorocar-
bon phase at least in part by the electrostatic attraction of
two oppositely charged or polar components, one of which
is at least partially soluble in the dispersed phase, the other
at least partially soluble in the continuous phase. One
component may provide colloidal stability of the emulsion,
and the other may prevent the adsorption of biomolecules at
the interface between a component and the discontinuous
phase. Advantageously, surfactants and surfactant combina-
tions of the invention may provide sufficient stabilization
against coalescence of droplets, without interfering with
processes that can be carried out inside the droplets.