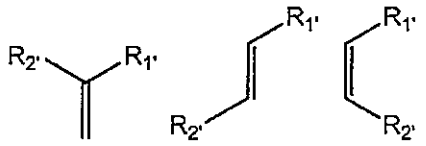
CLAIMS

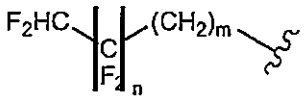
1. A cosmetic method of treating scalp hair comprising the step of:

applying to said hair a non-toxic composition comprising a fluorinated, non-polymeric compound of formula (I) with a cosmetically acceptable excipient,

wherein the compound is according to one of the formulae:



wherein $R_{1'}$ is $-CO_2R_{A'}$; and wherein $R_{A'}$ is



wherein n is an integer between 0 and 20, inclusive; and m is an even or odd integer between 1 and 6, inclusive; and

$R_{2'}$ is selected from the group consisting of hydrogen; halogen; cyclic or acyclic, substituted or unsubstituted, branched or unbranched aliphatic; cyclic or acyclic, substituted or unsubstituted, branched or unbranched heteroaliphatic; substituted or unsubstituted, branched or unbranched acyl; substituted or unsubstituted aryl; substituted or unsubstituted heteroaryl; $-OR_{A'}$; $-C(O)R_{A'}$; $-CO_2R_{A'}$; $-C(O)N(R_{A'})_2$; $-SR_{A'}$; $-SOR_{A'}$; $-SO_2R_{A'}$; $-NR_{A'}$; $-N(R_{A'})_2$; $-NHC(O)R_{A'}$; and $-C(R_{A'})_3$; and wherein each occurrence of $R_{A'}$ is independently selected from a group consisting of hydrogen, cyclic or acyclic, substituted or unsubstituted, branched or unbranched aliphatic; cyclic or acyclic, substituted or unsubstituted, branched or unbranched heteroaliphatic; substituted or unsubstituted, branched or unbranched acyl; substituted or unsubstituted aryl; substituted or unsubstituted heteroaryl; alkoxy; aryloxy; alkylthio; arylthio; amino; alkylamino; dialkylamino; heteroaryloxy; heteroarylthio and a protecting group; or $R_{1'}$ and $R_{2'}$ form a cyclic structure; provided that the composition and method do not employ a free radical initiator, a polymerization initiator or a polymerization catalyst.

2. The method according to claim 1, wherein the compound is selected from the group consisting of

2,2,3,3,4,4,5,5-octafluoro-1,6-hexyl dimethacrylate;

2,2,3,3,4,4,5,5-octafluoro-1,6-hexyl diacrylate;

1H,1H,11H-eicosafluoroundecyl acrylate;

1H,1H,11H-eicosafluoroundecyl methacrylate;

2,2,3,3,4,4,5,5-octafluoropentyl methacrylate;

2,2,3,3,4,4,5,5-octafluoropentyl acrylate;

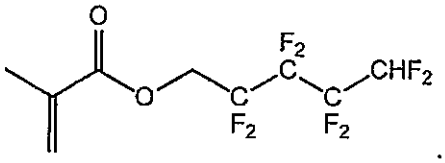
2,2,3,3,4,4-hexafluoro-1,5-pentyl diacrylate;

2,2,3,3,4,4-hexafluoro-1,5-pentyl dimethacrylate;

1H,1H,7H-dodecafluoroheptyl acrylate; and

1H,1H,7H-dodecafluoroheptyl methacrylate.

3. The method according to claim 1, wherein the compound is:



4. The method according to claim 1, wherein the compound does not substantially polymerize on the hair.

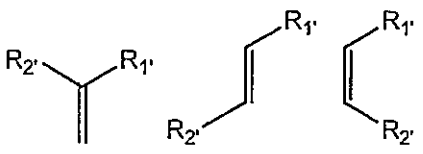
5. The method according to claim 1, wherein said method does not employ a step consisting of rinsing said hair after applying said composition.

6. The method according to claim 1, wherein said composition is a hair spray, conditioner, or shampoo.

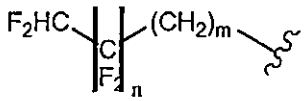
7. The method according to claim 1, wherein the method does not further employ a step of (i) applying a composition containing more than about 0.1% weight/weight of a uv-activated free radical initiator that is activated under ambient light, or (ii) applying a composition containing more than about 0.01% weight/weight of a free radical initiator selected from the group consisting of a heat-activated initiator that is activated at or above ambient temperature and an initiator that is active at ambient temperature.

8. A non-toxic hair care composition comprising a fluorinated, non-polymeric compound of formula (I) and a cosmetically acceptable excipient,

wherein the compound is according to one of the formulae:



wherein $R_{1'}$ is $-CO_2R_{A'}$; and wherein $R_{A'}$ is



wherein n is an integer between 0 and 20, inclusive; and m is an even or odd integer between 1 and 6, inclusive; and

$R_{2'}$ is selected from the group consisting of hydrogen; halogen; cyclic or acyclic, substituted or unsubstituted, branched or unbranched aliphatic; cyclic or acyclic, substituted or unsubstituted, branched or unbranched heteroaliphatic; substituted or unsubstituted, branched or unbranched acyl; substituted or unsubstituted aryl; substituted or unsubstituted heteroaryl; $-OR_{A'}$; $-C(O)R_{A'}$; $-CO_2R_{A'}$; $-C(O)N(R_{A'})_2$; $-SR_{A'}$; $-SOR_{A'}$; $-SO_2R_{A'}$; $-NR_{A'}$; $-N(R_{A'})_2$; $-NHC(O)R_{A'}$; and $-C(R_{A'})_3$; and wherein each occurrence of $R_{A'}$ is independently selected from a group consisting of hydrogen, cyclic or acyclic, substituted or unsubstituted, branched or unbranched aliphatic; cyclic or acyclic, substituted or unsubstituted, branched or unbranched heteroaliphatic; substituted or unsubstituted, branched or unbranched acyl; substituted or unsubstituted aryl; substituted or unsubstituted heteroaryl; alkoxy; aryloxy; alkylthio; arylthio; amino; alkylamino; dialkylamino; heteroaryloxy; heteroarylthio and a protecting group; or $R_{1'}$ and $R_{2'}$ form a cyclic structure; provided that the composition does not contain a free radical initiator, a polymerization initiator or a polymerization catalyst.

9. The hair care composition according to claim 8, wherein the cosmetically acceptable excipient comprises a rheology modifier and a non-ionic emulsifier, wherein the rheology modifier is selected from the group consisting of gyceryl polyacrylate, sodium polyacrylate, carbomer, acrylates copolymer, acrylic acid/vp crosspolymer, and xanthan gum; and the non-ionic emulsifier is selected from the group consisting of Laureth-23, Ocyldodeceth-20, Oleth-10, Peg-40 Hydrogenated Castor Oil, Polaxomer 127, Polysorbate 20, and Ceteareth-20.

10. The hair care composition according to claim 8, wherein the compound is selected from the group consisting of

2,2,3,3,4,4,5,5-octafluoro-1,6-hexyl dimethacrylate;

2,2,3,3,4,4,5,5-octafluoro-1,6-hexyl diacrylate;

1H,1H,11H-eicosafluoroundecyl acrylate;

1H,1H,11H-eicosafluoroundecyl methacrylate;

2,2,3,3,4,4,5,5-octafluoropentyl methacrylate;

2,2,3,3,4,4,5,5-octafluoropentyl acrylate;

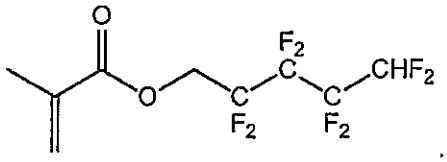
2,2,3,3,4,4-hexafluoro-1,5-pentyl diacrylate;

2,2,3,3,4,4-hexafluoro-1,5-pentyl dimethacrylate;

1H,1H,7H-dodecafluoroheptyl acrylate; and

1H,1H,7H-dodecafluoroheptyl methacrylate.

11. The hair care composition according to claim 8, wherein the compound is:



12. The hair care composition according to claim 8, wherein the composition is a hair spray, conditioner, or shampoo.

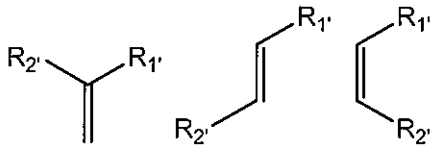
13. A method as claimed in any one of claims 1 to 7 for treating scalp hair comprising the step of applying to hair a non-toxic composition, wherein hair treated with the composition has at least 4 percent decreased moisture flux, resists dirt and has no more than 15 percent weight gain and the composition has at least 50 percent weight loss.

Claims

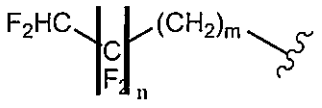
1. A cosmetic method of treating scalp hair comprising the step of:

applying to said hair a non-toxic composition comprising a fluorinated, non-polymeric compound of formula (I) with a cosmetically acceptable excipient,

wherein the compound is according to one of the formulae:



wherein $R_{1'}$ is $-CO_2R_{A'}$; and wherein $R_{A'}$ is



wherein n is an integer between 0 and 20, inclusive; and m is an even or odd integer between 1 and 6, inclusive; and

$R_{2'}$ is selected from the group consisting of hydrogen; halogen; cyclic or acyclic, substituted or unsubstituted, branched or unbranched aliphatic; cyclic or acyclic, substituted or unsubstituted, branched or unbranched heteroaliphatic; substituted or unsubstituted, branched or unbranched acyl; substituted or unsubstituted aryl; substituted or unsubstituted heteroaryl; $-OR_{A'}$; $-C(O)R_{A'}$; $-CO_2R_{A'}$; $-C(O)N(R_{A'})_2$; $-SR_{A'}$; $-SOR_{A'}$; $-SO_2R_{A'}$; $-NR_{A'}$; $-N(R_{A'})_2$; $-NHC(O)R_{A'}$; and $-C(R_{A'})_3$; and wherein each occurrence of $R_{A'}$ is independently selected from a group consisting of hydrogen, cyclic or acyclic, substituted or unsubstituted, branched or unbranched aliphatic; cyclic or acyclic, substituted or unsubstituted, branched or unbranched heteroaliphatic; substituted or unsubstituted, branched or unbranched acyl; substituted or unsubstituted aryl; substituted or unsubstituted heteroaryl; alkoxy; aryloxy; alkylthio; arylthio; amino; alkylamino; dialkylamino; heteroaryloxy; heteroarylthio and a protecting group; or $R_{1'}$ and $R_{2'}$ form a cyclic structure;

provided that the composition and method do not employ a free radical initiator, a polymerization initiator or a polymerization catalyst.

2. The method according to claim 1, wherein the compound is selected from the group consisting of

1H,1H,11H-eicosafluoroundecyl acrylate;

1H,1H,11H-eicosafluoroundecyl methacrylate;

2,2,3,3,4,4,5,5-octafluoropentyl methacrylate;

2,2,3,3,4,4,5,5-octafluoropentyl acrylate;

1H,1H,7H-dodecafluoroheptyl acrylate; and

1H,1H,7H-dodecafluoroheptyl methacrylate.

3. A cosmetic method of treating scalp hair comprising the step of applying to said hair a non-toxic composition comprising a fluorinated, non-polymeric compound with a cosmetically acceptable excipient, wherein the compound is selected from the group consisting of:

2,2,3,3,4,4,5,5-octafluoro-1,6-hexyl dimethacrylate;

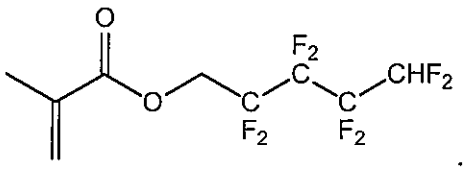
2,2,3,3,4,4,5,5-octafluoro-1,6-hexyl diacrylate;

2,2,3,3,4,4-hexafluoro-1,5-pentyl diacrylate;

2,2,3,3,4,4-hexafluoro-1,5-pentyl dimethacrylate;

provided that the composition and method do not employ a free radical initiator, a polymerization initiator or a polymerization catalyst.

4. The method according to claim 1, wherein the compound is:



5. The method according to claim 1, wherein the compound does not substantially polymerize on the hair.

6. The method according to claim 1, wherein said method does not employ a step consisting of rinsing said hair after applying said composition.

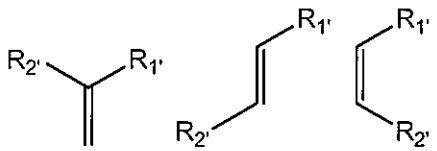
7. The method according to claim 1, wherein said composition is a hair spray, conditioner, or shampoo.

8. The method according to claim 1, wherein the method does not further employ a step of (i) applying a composition containing more than about 0.1% weight/weight of a uv-activated free radical initiator that is activated under ambient light, or (ii) applying a composition containing more than about 0.01% weight/weight of a free radical initiator selected from the group consisting of a heat-activated initiator that is activated at or above ambient temperature and an initiator that is active at ambient temperature.

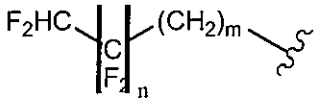
9. A non-toxic hair care composition comprising a fluorinated, non-polymeric compound of formula (I) and

a cosmetically acceptable excipient,

wherein the compound is according to one of the formulae:



wherein $R_{1'}$ is $-CO_2R_{A'}$; and wherein $R_{A'}$ is



wherein n is an integer between 0 and 20, inclusive; and m is an even or odd integer between 1 and 6, inclusive; and

$R_{2'}$ is selected from the group consisting of hydrogen; halogen; cyclic or acyclic, substituted or unsubstituted, branched or unbranched aliphatic; cyclic or acyclic, substituted or unsubstituted, branched or unbranched heteroaliphatic; substituted or unsubstituted, branched or unbranched acyl; substituted or unsubstituted aryl; substituted or unsubstituted heteroaryl; $-OR_{A'}$; $-C(O)R_{A'}$; $-CO_2R_{A'}$; $-C(O)N(R_{A'})_2$; $-SR_{A'}$; $-SOR_{A'}$; $-SO_2R_{A'}$; $-NR_{A'}$; $-N(R_{A'})_2$; $-NHC(O)R_{A'}$; and $-C(R_{A'})_3$; and wherein each occurrence of $R_{A'}$ is independently selected from a group consisting of hydrogen, cyclic or acyclic, substituted or unsubstituted, branched or unbranched aliphatic; cyclic or acyclic, substituted or unsubstituted, branched or unbranched heteroaliphatic; substituted or unsubstituted, branched or unbranched acyl; substituted or unsubstituted aryl; substituted or unsubstituted heteroaryl; alkoxy; aryloxy; alkylthio; arylthio; amino; alkylamino; dialkylamino; heteroaryloxy; heteroarylthio and a protecting group; or $R_{1'}$ and $R_{2'}$ form a cyclic structure;

provided that the composition does not contain a free radical initiator, a polymerization initiator or a polymerization catalyst.

10. The hair care composition according to claim 9, wherein the cosmetically acceptable excipient comprises a rheology modifier and a non-ionic emulsifier, wherein the rheology modifier is selected from the group consisting of gyceryl polyacrylate, sodium polyacrylate, carbomer, acrylates copolymer, acrylic acid/vp crosspolymer, and xanthan gum; and the non-ionic emulsifier is selected from the group consisting of

Laureth-23, Ocyldodeceth-20, Oleth-10, Peg-40 Hydrogenated Castor Oil, Polaxomer 127, Polysorbate 20, and Ceteareth-20.

11. The hair care composition according to claim 9, wherein the compound is selected from the group consisting of

1H,1H,11H-eicosafluoroundecyl acrylate;

1H,1H,11H-eicosafluoroundecyl methacrylate;

2,2,3,3,4,4,5,5-octafluoropentyl methacrylate;

2,2,3,3,4,4,5,5-octafluoropentyl acrylate;

1H,1H,7H-dodecafluoroheptyl acrylate; and

1H,1H,7H-dodecafluoroheptyl methacrylate.

12. A non-toxic composition comprising a fluorinated, non-polymeric compound and a cosmetically acceptable excipient, wherein the compound is selected from the group consisting of:

2,2,3,3,4,4,5,5-octafluoro-1,6-hexyl dimethacrylate;

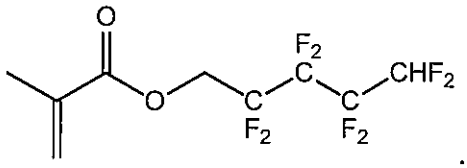
2,2,3,3,4,4,5,5-octafluoro-1,6-hexyl diacrylate;

2,2,3,3,4,4-hexafluoro-1,5-pentyl diacrylate;

2,2,3,3,4,4-hexafluoro-1,5-pentyl dimethacrylate;

provided that the composition does not contain a free radical initiator, a polymerization initiator or a polymerization catalyst.

13. The hair care composition according to claim 9, wherein the compound is:



14. The hair care composition according to claim 9, wherein the composition is a hair spray, conditioner, or shampoo.

15. A method as claimed in any one of claims 1 to 8 for treating scalp hair comprising the step of applying to hair a non-toxic composition, wherein hair treated with the composition has at least 4 percent decreased moisture flux, resists dirt and has no more than 15 percent weight gain and the composition has at least 50 percent weight.