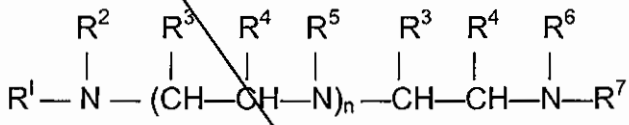
It is claimed:

1. A composition for controlling air in hydratable cementitious compositions, comprising:

(A) at least one agent operative to entrain air in a hydratable cementitious composition, said at least one agent comprising a higher trialkanolamine, a lignosulfonate, a naphthalene sulfonate, a melamine sulfonate, an oxyalkylene-containing superplastizicer, an oxyalkylene-containing shrinkage reducing agent, or mixture thereof;

(B) a polyalkoxylated polyalkylene polyamine defoamer having a structure represented by Formula (1)



(1)

or salt thereof, or combination of said defoamer and salt thereof, wherein each of R^1, R^2, R^3, R^4, R^5, R^6, and R^7 independently represents a hydrogen, C_1-C_4 alkyl group, -CH_2-OH, or $-(AO)_x-R^8$ wherein AO represents propylene oxide ("PO") or a mixture of PO and ethylene oxide ("EO") wherein the molar ratio of PO to EO is at least 100:0 to 100:90; "x" represents an integer of 0 to 100; and R^8 represents hydrogen or an alkyl group; "n" represents an integer of 0 to 100; and

wherein, if "n" is 0 then the amount of EO is less than 10% by weight based on total weight of said polyalkoxylated polyalkylene polyamine defoamer; and

(C) The ratio of component A to component B is in the range of 5 to 100 by dry weight.

2. The composition of claim 1 wherein said defoamer is made by polyalkoxylation of a polyalkylene polyamine.

3. The composition of claim 2 wherein said polyalkylene polyamine is selected from the group consisting of ethylene diamine, diethylene triamine,

triethylene tetramine, tetraethylene pentamine, pentaethylene hexamine, propylene diamine, dipropylene triamine, tripropylene tetramine, tetrapropylene pentamine, pentapropylene hexamine, N,N-dimethylethylene diamine, N,N'-dimethylethylene diamine, N,N-dimethylpropylene diamine, N,N'-dimethylpropylene diamine, N,N-diethylethylene diamine, N,N'-diethylethylene diamine, N,N-diethylpropylene diamine, N,N'-diethylpropylene diamine.

4. The composition of claim 2 wherein said polyalkylene polyamine is ethylene diamine, diethylene triamine, triethylene tetramine, or mixture thereof.

5. The composition of claim 2 wherein said polyalkylene polyamine is diethylene triamine.

6. The composition of claim 1 wherein said polyalkylene polyamine is alkoxylated by reacting the polyalkyklene polyamine with ethylene oxide, propylene oxide, or higher alkylene oxide.

7. The composition of claim 1 wherein said polyoxyalklene polyamine is alkoxylated by reacting the polyalkylene polyamine with ethylene oxide and propylene oxide, wherein the molar ratio of propylene oxide to ethylene oxide is greater than 1.

8. The composition of claim 1 wherein "x" is an integer of 4 to 100.

9. The composition of claim 1 wherein "x" is an integer of 20 to 80.

10. The composition of claim 1 wherein "x" is an integer of 35 to 60.

11. The composition of claim 1 wherein said polyalkoxylated polyalkylene polyamine defoamer of component B has a number-average molecular weight of 500 – 7,000.

12. The composition of claim 1 wherein said polyalkoxylated polyalkylene polyamine defoamer of component B has a number-average molecular weight of 1,000 – 5,000.

13. The composition of claim 1 wherein said polyalkoxylated polyalkylene polyamine defoamer of component B has a number-average molecular weight of 2,000 – 3,500.

14. The composition of claim 1 wherein the ratio of component A to component B is in the range of 14 to 70 by percentage weight based on total weight of said composition for controlling air.

15. The composition of claim 1 wherein the ratio of component A to component B is in the range of 20 to 50 by percentage weight based on total weight of said composition for controlling air.

16. The composition of claim 1 wherein said polyalkoxylated polyalkylene polyamine is neutralized with an acid.

17. The composition of claim 16 wherein said acid is selected from formic acid, acetic acid, propionic acid, hydrochloric acid, nitric acid, sulfuric acid, or a mixture thereof.

18. The composition of claim 16 wherein said acid is formic acid or acetic acid.

19. The composition of claim 16 wherein said acid is an oxyalkylene-containing superplasticizer.

20. A method for modifying a cementitious composition, comprising: combining with a hydratable cementitious binder the composition of claim 1.

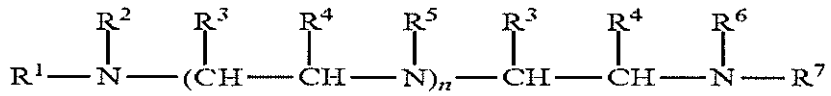
21. A cement composition comprising a hydratable cementitious binder and the composition of claim 1.

The invention claimed is:

1. A composition for controlling air in hydratable cementitious compositions, comprising:

(A) at least one agent operative to entrain air in a hydratable cementitious composition, said at least one agent comprising a higher trialkanolamine, a lignosulfonate, a naphthalene sulfonate, a melamine sulfonate, an oxyalkylene-containing superplasticizer, an oxyalkylene-containing shrinkage reducing agent, or mixture thereof;

(B) a polyalkoxylated polyalkylene polyamine defoamer formed by alkoxylating a polyalkylene polyamine with ethylene oxide, propylene oxide, or mixture thereof, wherein the amount of ethylene oxide groups is in the range of 0%-40% based on total weight of polyethers, and the amount of polypropylene oxide groups is in the range of 60%-100% based on total weight of polyethers, the molar ration of propylene oxide to ethylene oxide being greater than 1, said polyalkoxylated polyalkylene polyamine defoamer having a structure represented by formula (1)



(1)

or salt thereof, or combination of said defoamer and salt thereof, wherein each of R^1, R^2, R^3, R^4, R^5, R^6, and R^7 independently represents a hydrogen, C_1-C_4 alkyl group, —CH_2—OH, or -$(AO)_x$—R^8 ; and wherein at least one of said R^1, R^2, R^3, R^4, R^5, R^6, and R^7 is -(AO_x)—R^8; and wherein AO represents propylene oxide ("PO") or a mixture of PO and ethylene oxide ("EO") wherein the molar ratio of PO to EO is at least 100:0 to 100:90; "x" represents an integer of 4 to 100; and R^8 represents hydrogen or an alkyl group; "n" represents an integer of 0 to 100; and

wherein, if "n" is 0 then the amount of EO is less than 10% by weight based on total weight of said polyalkoxylated polyalkylene polyamine defoamer; and

(C) The ratio of component A to component B is in the range of 5 to 100 by dry weight.

2. The composition of claim 1 wherein said polyalkylene polyamine is selected from the group consisting of ethylene diamine, diethylene triamine, triethylene tetramine, tetraethylene pentamine, pentaethylene hexamine, propylene diamine, dipropylene triamine, tripropylene tetramine, tetrapropylene pentamine, pentapropylene hexamine, N,N-dimethylethylene diamine, N,N'-dimethylethylene diamine, N,N-dimethylpropylene diamine, N,N'-dimethylpropylene diamine, N,N-diethylethylene diamine, N,N'-diethylethylene diamine, N,N-diethylpropylene diamine, N,N'-diethylpropylene diamine.

3. The composition of claim 1 wherein said polyalkylene polyamine is ethylene diamine, diethylene triamine, triethylene tetramine, or mixture thereof.

4. The composition of claim 1 wherein said polyalkylene polyamine is diethylene triamine.

5. The composition of claim 1 wherein "x" is an integer of 20 to 80.

6. The composition of claim 1 wherein "x" is an integer of 35 to 60.

7. The composition of claim 1 wherein said polyalkoxylated polyalkylene polyamine defoamer of component B has a number-average molecular weight of 500-7,000.

8. The composition of claim 1 wherein said polyalkoxylated polyalkylene polyamine defoamer of component B has a number-average molecular weight of 1,000-5,000.

9. The composition of claim 1 wherein said polyalkoxylated polyalkylene polyamine defoamer of component B has a number-average molecular weight of 2,000-3,500.

10. The composition of claim 1 wherein the ratio of component A to component B is in the range of 14 to 70 by percentage weight based on total weight of said composition for controlling air.

11. The composition of claim **1** wherein the ratio of component A to component B is in the range of 20 to 50 by percentage weight based on total weight of said composition for controlling air.

12. The composition of claim **1** wherein said polyalkoxylated polyalkylene polyamine is neutralized with an acid.

13. The composition of claim **12** wherein said acid is selected from formic acid, acetic acid, propionic acid, hydrochloric acid, nitric acid, sulfuric acid, or a mixture thereof.

14. The composition of claim **12** wherein said acid is formic acid or acetic acid.

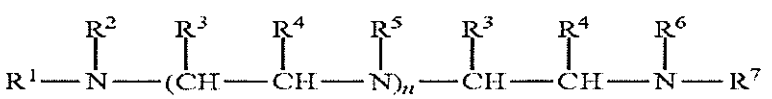
15. The composition of claim **12** wherein said acid is an oxyalkylene-containing superplasticizer.

16. A cement compostion comprising a hydratable cementitious binder and the composition of claim **1**.

17. A polypropoxylated composition for controlling air in hydratable cementitious compositions, comprising:

(A) at least one agent operative to entrain air in a hydratable cementitious composition, said at least one agent comprising a higher trialkanolamine, a lignosulfonate, a naphthalene sulfonate, a melamine sulfonate, an oxyalkylene-containing superplasticizer, an oxyalkylene-containing shrinkage reducing agent, or mixture thereof;

(B) a polypropoxylated polyalkylene polyamine defoamer comprising ethylene oxide, propylene oxide, or mixture thereof, wherein the amount of ethylene oxide groups is in the range of 0%-40% based on total weight of polyethers, and the amount of polypropylene oxide groups is in the range of 60%-100% based on total weight of polyethers, the molar ratio of propylene oxide to ethylene oxide being greater than 1, said polypropoxylated polyalkylene polyamine defoamer having a structure represented by Formula (1)



(1)

or salt thereof, or combination of said defoamer and salt thereof, wherein each of R^1, R^2, R^3, R^4, R^5, R^6, and R^7

independently represents a hydrogen, C_1-C_4 alkyl group, —CH_2—OH, or -$(AO)_x$—R^8; and wherein at least one of said R^1, R^2, R^3, R^4, R^5, R^6, and R^7 is -$(AO)_x$—R^8; and wherein AO represents propylene oxide ("PO") or a mixture of PO and ethylene oxide ("EO") wherein the molar ratio of PO to EO is at least 100:0 to 100:90; "x" represents an integer of 4 to 100; and R^8 represents hydrogen or an alkyl group;

"n" represents an integer of 0 to 100; and

wherein, if "n" is 0 then the amount of EO is less than 10% by weight based on total weight of said polypropoxylated polyalkylene polyamine defoamer; and

(C) The ratio of component A to component B is in the range of 5 to 100 by dry weight.