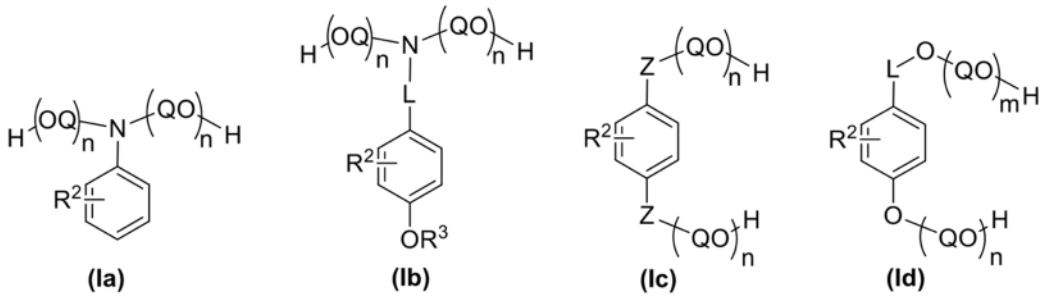
What is claimed is:

1. A method for preparing a polymer, comprising

performing a polycondensation of a polyether macromonomer A, a monomer B and an aldehyde C,

wherein the polyether macromonomer A has a structural formula (Ia), (Ib), (Ic), or (Id):

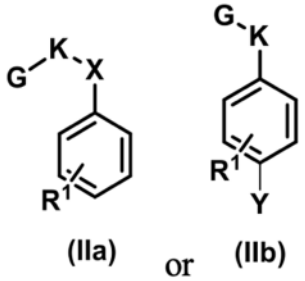


in which Z is NR^3, O or $O(CH_2)_fO$, L = $O(CH_2)_f$ or $(CH_2)_f$, f is an integer from 1 to 10, Q is C2 to C24 alkylene, R^2 is H or C1 to C10 alkyl, R^3 is a C1 to C10 alkyl, m = 8 to 112, n = 8 to 112;

the monomer B is p-aminophenylsulfonic acid, o-aminophenylsulfonic acid,

p-hydroxylbenzoic acid, o-hydroxylbenzoic acid, p-aminobenzoic acid, o-aminobenzoic acid, p-hydroxylphenylsulfonic acid, o-hydroxylphenylsulfonic acid,

or has a structural formula (IIa) or (IIb):



in which G is $N(CH_2\text{-}PO_3H_2)_2$, $NH\text{-}CH_2PO_3H_2$, $NR^6\text{-}CH_2PO_3H_2$, $C(OH)(PO_3H_2)_2$, $CH(OPO_3H_2)CH_2\text{-}OPO_3H_{22}$, OPO_3H_2, wherein

R^1 is H, a C1 to C10 alkyl or SO_3H,

K is a C1 to C10 alkylene,

X = NR^8 or O, Y is OH or OR^7, R^7 is a C1 to C10 alkyl,

R^6 and R^8 are independently from each other are a C1 to C10 alkyl,

the aldehyde C has a structural formula (III):

$$R^5CHO \qquad \text{(III)}$$

in which R^5 is H, COOH, or a C1 to C10 alkyl; and

a molar ratio of the polyether macromonomer A and the monomer B is

1:0.5 to 1:12,

wherein the polymer has a weight average molecular weight of 4000 g/mol to 150000 g/mol.

2. The method for preparing the polymer of claim 1, wherein,

Z is O or $O(CH_2)_fO$, f = 1 to 3;

L is $(CH_2)_f$, f = 1 to 3;

Q is C2 to C4 alkylene;

R^1 is H or a C1 to C3 alkyl;

R^2 is H or a C1 to C3 alkyl;

R^3 is a C1 to C3 alkyl;

X is NR^8 or O;

R^8 is a C1 to C3 alkyl;

Y is OH or OR^7;

R^7 is preferably a C1 to C3 alkyl;

K is a C1 to C3 alkylene; and

R^5 is H, COOH or a C1 to C3 alkyl.

3. The method for preparing the polymer of claim 2, wherein the monomer B has a structural formula (IIa) or (IIb) in which G is $N(CH_2\text{-}PO_3H_2)_2$, $C(OH)(PO_3H_2)_2$, or $CH(OPO_3H_2)CH_2\text{-}OPO_3H_2$.

4. The method for preparing the polymer of claim 1, wherein the polyether macromonomer A has a molecular weight of 1000 to 10000 g/mol.

5. The method for preparing the polymer of claim 1, wherein a molar ratio of the polyether macromonomer A and the monomer B is 1:1.0 to 1:6.0.

6. The method for preparing the polymer of claim 1, wherein

a molar ratio between the aldehyde C and a combined molar amount of polyether macromonomer A and monomer B is 1.0 to 2.0.

7. The method for preparing the polymer of claim 1, wherein the conditions of the polycondensation are: a reaction temperature of 80 to 140°C and a reaction time of 1 to 8h.

8. A method of using the polymer obtained by the method of claim 1 including

using the polymer as a dispersant for an aqueous dispersion of a hydraulic binder and/or a latent hydraulic binder.

9. The method of claim 8, wherein the hydraulic binder is at least one of cement, lime, gypsum, and anhydrous gypsum, and the latent hydraulic binder is pozzolana, fly ash or blast furnace slag.

10. The method for preparing the polymer of claim 1, wherein
the polymer has a weight average molecular weight from 8000 g/mol to 100000 g/mol.

11. The method for preparing the polymer of claim 1, wherein
the polymer has a weight average molecular weight from 10000 g/mol to 40000 g/mol.

12. The method for preparing the polymer of claim 2, wherein
Z is O or $O(CH_2)_fO$, f = 1 to 2;
Q is C2 to C3 alkylene;
R^1 is H;
R^2 is H;
R^3 is methyl;
R^8 is methyl or ethyl;
R^7 is methyl or ethyl; and
R^5 is H or COOH.

13. The method for preparing the polymer of claim 3, wherein the monomer B has a structural formula (IIa) or (IIb) in which G is $N(CH_2\text{-}PO_3H_2)_2$, or $C(OH)(PO_3H_2)_2$.

14. The method for preparing the polymer of claim 7, wherein the conditions of the polycondensation are: the reaction temperature of 90 to 130°C and the reaction time of 2 to 6h.

15. The method of using the polymer of claim 9, wherein the hydraulic binder is cement.

16. The method for preparing the polymer of claim 12, wherein

Z is O;

Q is CH_2CH_2;

R^8 is methyl;

R^7 is methyl; and

R^5 is H or COOH.