We claim:

1. An AB monomer, comprising bisanhydrohexitol derivatives capable of self-polymerization directly to form stereoregular or regioregular condensation polymer of the general type

A-X-C-Y-B

wherein A is selected from the group consisting of carboxylic acids, ester derivatives of carboxylic acids, and reactive carbonyl derivatives of carboxylic acids such as an acid chloride; Y is a bisanhydrohexitol unit derived from the group consisting of isosorbide, isoidide and isomannide; X is selected from the group consisting of aromatic rings, including 1,4-phenylene, 1,3-phenylene, 2,6-naphthalene and 2,7-naphthalene, and substituted derivatives thereof, and suitable heterocyclic variants, including 2,5-furan and 2,5-thiophene, and both saturated and unsaturated aliphatic chains and acyclic compounds; B is –OH; and C is selected from the group consisting of ether oxygen, a sulfide sulfur, and an amine, and NH or NR wherein R is C1 to C6, attaching X to Y.

2. A process for producing an AB monomer, comprising the steps of:

(a) reacting a substituted derivative of an bisanhydrohexitol with a protective moiety to protect one of the –OH groups of the substituted derivative of an bisanhydrohexitol;

(b) converting the unprotected –OH group to a derivative susceptible to nucleophilic substitution;

(c) reacting the protected substituted derivative of an bisanhydrohexitol with a compound selected from the group consisting of substituted and unsubstituted aromatic phenols and thiophenols, substituted and unsubstituted aromatic primary and secondary amines, aliphatic unsaturated and alicyclic alcohols, and aliphatic unsaturated and alicyclic primary and secondary amines, and their derivatives, to attach the compound to the protected bisanhydrohexitol at the derivatized –OH group via an ether linkage; and

(d) removing the protective moiety.

3. A regiospecific oligomer or homopolymer, comprising a homopolymerization product of an AB monomer as defined in claim 1.

4. A process for producing a stereoregular AB oligomer or homopolymer, comprising reacting an AB monomer of claim 1, optionally with a catalyst, either in the melt or in solution under conditions to effect polymerization.

5. A process for producing a copolyester, comprising melting an AB monomer of claim 1 and a polyester, optionally with a catalyst, under conditions to effect copolymerization.

6. A process for producing copolyester, comprising mixing an AB monomer of claim 1 into a polymerization reactor containing monomers or prepolymers which may be of the AA-BB or AB type, optionally with a catalyst, under conditions to effect copolymerization.

7. A method for improving the performance of a first polymer, comprising melt mixing the polymer with an AB homopolymer of claim 3 under conditions to effect transesterification.

8. The method of claim 7, wherein the first polymer is selected from the group consisting of aromatic and aliphatic polyesters.

9. The method of claim 1, wherein the bisanhydrohexitol is selected from the group consisting of isosorbide, isomannide and isoidide.

10. A method of introducing an bisanhydrohexitol moiety into a polyester with reduced loss of the bisanhydrohexitol during polymerization, comprising use of an AB monomer of claim 1 as a monomer in the polymerization as the source of the bisanhydrohexitol moiety.

11. A method of improving the crystallinity of a polymer made using a first monomer, comprising substituting in a polymerization reaction a second monomer of claim 1 for at least some of the first monomer.

12. A method of introducing an isoidide moiety into a polymer, comprising the steps of:

(a) making a monomer according to claim 1 wherein the bisanhydrohexitol is isosorbide; and

(b) using the monomer in a polymerization reaction wherein isosorbide is epimerized to isoidide during a nucleophilic substitution reaction.

13. A method of introducing bisanhydrohexitol moieties into a condensation polymer, comprising adding one or more AB monomers of claim 1 as an initial reaction material to the condensation polymer initial reaction mixture.

14. A method of introducing bisanhydrohexitol moieties into a condensation polymer, comprising transesterifying one or more AB monomers of claim 1 into the condensation polymer backbone.

15. A method of forming an oligomer or polymer, comprising self-polymerizing an AB monomer of claim 1 to form a regio-regular condensation oligomer or polymer.

16. A method of introducing bisanhydrohexitol moieties into a condensation polymer, comprising adding an oligomer or polymer of claim 15 as an initial reaction material to the condensation polymer initial reaction mixture.

17. A method of introducing bisanhydrohexitol moieties into a condensation polymer, comprising transesterifying one or more oligomers or homopolymers of claim 15 into the condensation polymer backbone.

18. A method of forming an oligomer or polymer, comprising polymerizing a mixture of two or more distinct AB monomers of claim 1 to form a regio-regular condensation oligomer or polymer.

19. A method of introducing bisanhydrohexitol moieties into a condensation polymer, comprising adding an oligomer or polymer of claim 18.

20. A method of introducing bisanhydrohexitol moieties into a condensation polymer, comprising transesterifying one or more oligomers or polymers of claim 18 into the condensation polymer backbone.

21. A method of introducing bisanhydrohexitol moieties into a condensation polymer, comprising adding one or more AB monomers of claim 1 as an initial reaction material to the condensation polymer initial reaction mixture and processing the combination in a reactive extruder.

22. A method of forming an oligomer or polymer, comprising adding one or more AB monomers of claim 1 as an initial reaction material to the condensation polymer initial reaction mixture and polymerizing the combination to form a condensation oligomer or polymer having regio-regular blocks of the AB monomer or monomers.

23. A method of introducing bisanhydrohexitol moieties into a poly(ethylene terpthalate) polymer, comprising transesterifying one or more AB monomers of claim 1, into the poly(ethylene terpthalate) polymer backbone to form a copolymer that has an increased Tg as compared to the Tg of the poly(ethylene terpthalate) polymer itself.

24. A method as defined in claim 23, further comprising transesterifying one or more oligomers or polymers of claim 4 into the poly(ethylene terpthalate) polymer backbone to form a copolymer that has an increased Tg as compared to the Tg of the poly(ethylene terpthalate) polymer itself.

25. A method as defined in claim 23, further comprising transesterifying one or more oligomers or polymers of claim 15 into the poly(ethylene terpthalate) polymer backbone to form a copolymer that has an increased Tg as compared to the Tg of the poly(ethylene terpthalate) polymer itself.

26. A method as defined in claim 23, further comprising transesterifying one or more oligomers or polymers of claim 18 into the poly(ethylene terpthalate) polymer backbone to form a copolymer that has an increased Tg as compared to the Tg of the poly(ethylene terpthalate) polymer itself.

27. A method as defined in claim 23, further comprising transesterifying one or more oligomers or polymers of claim 22 into the poly(ethylene terpthalate) polymer backbone to form a copolymer that has an increased Tg as compared to the Tg of the poly(ethylene terpthalate) polymer itself.

28. A method of introducing bisanhydrohexitol moieties into a poly(ethylene terpthalate) polymer, comprising transesterifying one or more oligomers or polymers of claim 4, into the poly(ethylene terpthalate) polymer backbone to form a copolymer that has an increased Tg as compared to the Tg of the poly(ethylene terpthalate) polymer itself.

29. A method of introducing bisanhydrohexitol moieties into a poly(ethylene terpthalate) polymer, comprising transesterifying one or more AB monomers of claim 15, into the poly(ethylene terpthalate) polymer backbone to form a copolymer that has an increased Tg as compared to the Tg of the poly(ethylene terpthalate) polymer itself.

30. A method of introducing bisanhydrohexitol moieties into a poly(ethylene terpthalate) polymer, comprising transesterifying one or more AB monomers of claim 18, into the poly(ethylene terpthalate) polymer backbone to form a copolymer that has an increased Tg as compared to the Tg of the poly(ethylene terpthalate) polymer itself.

31. A method of introducing bisanhydrohexitol moieties into a poly(ethylene terpthalate) polymer, comprising transesterifying one or more AB monomers of claim 22, into the poly(ethylene terpthalate) polymer backbone to form a copolymer that has an increased Tg as compared to the Tg of the poly(ethylene terpthalate) polymer itself.

CLAIMS

1. An invention not claimed in any divisional application.