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

where A is a carboxylic acid or ester or reactive carbonyl derivative such as an acid chloride, Y is a bisanhydrohexitol unit derived from isosorbide, isoidide or isomannide and X is selected from the group consisting of aromatic rings, including 1,4-phenylene, 1,3-phenylene, 2,6-naphthalene or 2,7-naphthalene (or substituted derivatives thereof), and suitable heterocyclic variants, including 2,5-furan and 2,5-thiophene, both saturated and unsaturated aliphatic chains and acyclic compounds, and B is –OH and C is an ester carbonyl link with the carbon attached to X and the oxygen attached 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) reacting the protected substituted derivative of an bisanhydrohexitol with a compound selected from the group consisting of substituted and unsubstituted aromatic, or heterocyclic or aliphatic unsaturated and alicyclic acids and their derivatives to attach the compound to the protected bisanhydrohexitol at the unprotected –OH group via an ester, thioester or amide linkage; and
   (c) removing the protective moiety to create an AB monomer.

3. A process for producing a stereoregular AB homopolymer, comprising melting an AB monomer of claim 2, optionally with a catalyst, under conditions to effect polymerization.

4. 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.

5. A process for making a copolyester by reacting an AB monomer from claim 1 and a polyester, preferably under melt polymerization conditions.

6. A process for producing copolyesters, comprising mixing an AB monomer of claim 1 into a polymerization reactor containing monomers or prepolymers, optionally 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 1 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 introducing an bisanhydrohexitol moiety into a polyester with reduced loss of the bisanhydrohexitol during polymerization, comprising use of an AB homopolymer of claim 3 as a copolymer in the polymerization as the source of the bisanhydrohexitol moiety.

12. 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.

13. 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.

14. 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.

15. 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 polymers of claim 12 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 12.

20. A method as defined in claim 19, wherein the condensation polymer is selected from the group consisting of poly(ethylene terephthalate) and poly(lactic acid).

21. A method of introducing bisanhydrohexitol moieties into a condensation polymer, comprising transesterifying one or more oligomers or polymers of claim 12 into the condensation polymer backbone.

22. A method as defined in claim 21, wherein the condensation polymer is selected from the group consisting of poly(ethylene terephthalate) and poly(lactic acid).

23. A method of introducing bisanhydrohexitol moieties into a condensation polymer, comprising adding one or more AB monomers of claim 12 as an initial reaction material to the condensation polymer initial reaction mixture and processing the combination in a reactive extruder.

24. A method of forming an oligomer or polymer, comprising adding one or more AB monomers of claim 12 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.

CLAIMS

1. An invention not claimed in any divisional application.