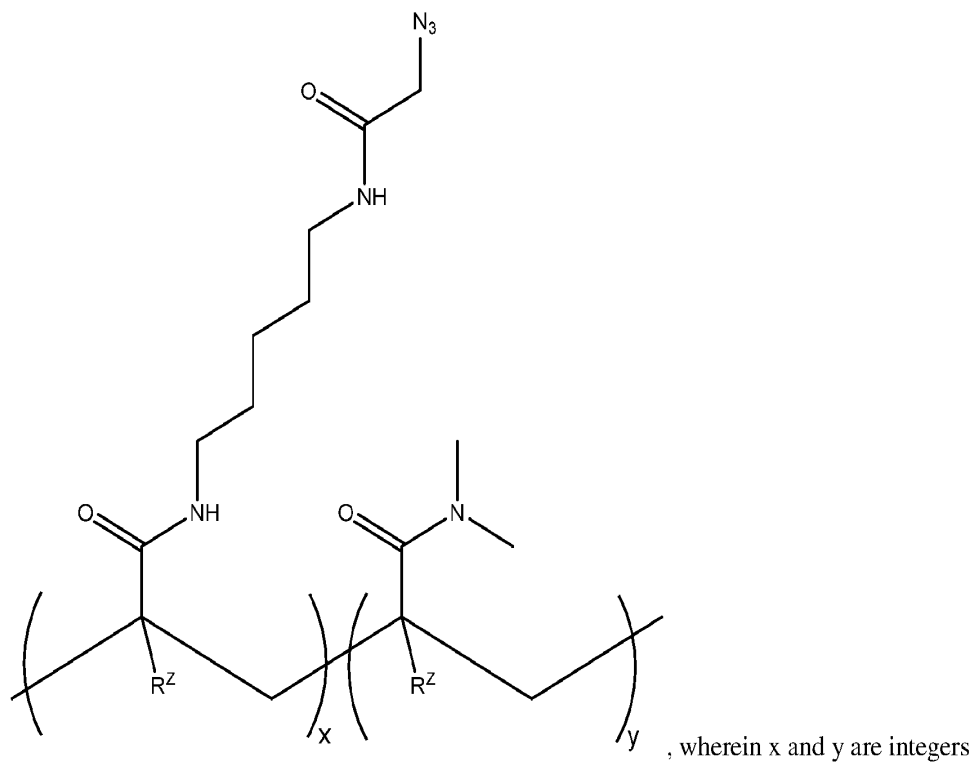


WHAT IS CLAIMED IS:

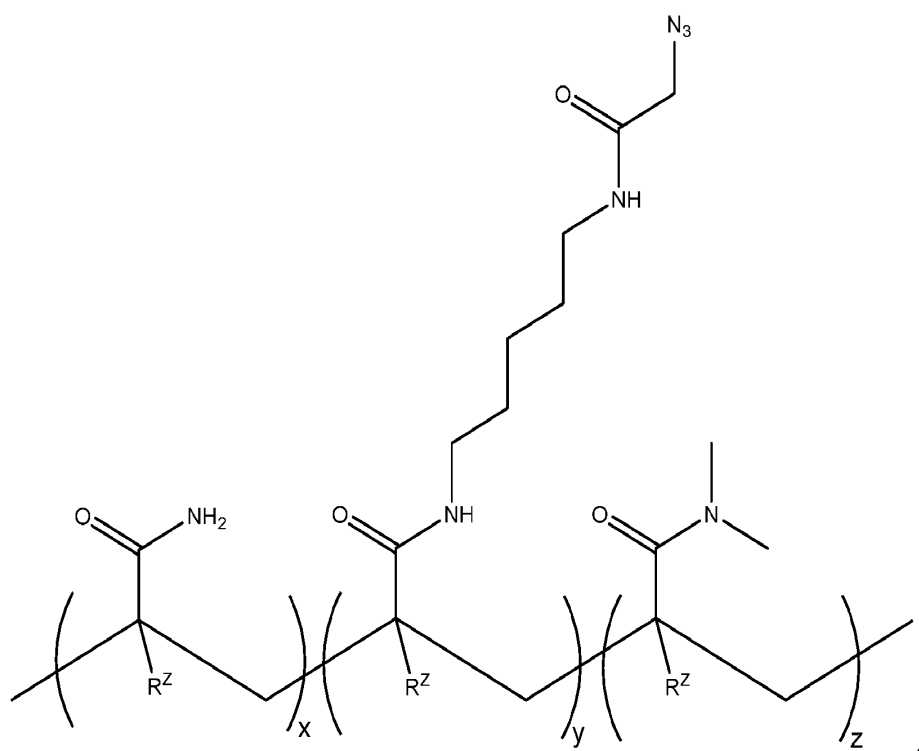
1. A method, comprising
hybridizing test primers to immobilized primers; wherein the immobilized primers comprise a predetermined sequence of nucleotides and are attached to a substrate through their 5-prime ends, individual test primers are complementary to a portion of each of at least some of the immobilized primers, and no more than one test primer molecule hybridizes to an immobilized primer molecule,
extending, using one nucleotide, at least some of the test primers with a polymerase according to templates; wherein said templates comprise immobilized primers hybridized to said at least some of the test primers, and nucleotides incorporated into said at least some of the test primers by the extending comprise one of a plurality of fluorescent tags, and
detecting an amount of fluorescent test primers.
2. The method of claim 1, wherein nucleotide sequences of a first plurality of the immobilized primers differ from nucleotide sequences of a second plurality of the immobilized primers.
3. The method of claim 2, wherein a first plurality of the test primers is complementary to a portion of the first plurality of immobilized primers, and a second plurality of the test primers is complementary to a portion of the second plurality of immobilized primers.
4. The method of claim 3, wherein first nucleotides incorporated into the first plurality of the test primers comprise a first of the plurality of fluorescent tags, second nucleotides incorporated into the second plurality of the test primers comprise a second of the plurality of fluorescent tags, and fluorescence emitted by the first of the plurality of fluorescent tags differs from fluorescence emitted by the second of the plurality of fluorescent tags.
5. The method of any one of claims 1 through 4, wherein the substrate comprises a metal oxide.
6. The method of any one of claims 1 through 4, wherein the substrate comprises a metallic oxide and the metal oxide is selected from the group consisting of silicon dioxide, fused silica, tantalum pentoxide, titanium dioxide, aluminum oxide, hafnium oxide, and graphene oxide.
7. The method of any one of claims 1 through 6, wherein the substrate further comprises a polymer.

8. The method of claim 7, wherein at least some of the immobilized primers are attached to the polymer.

9. The method of claim 8, wherein the polymer is a heteropolymer selected from

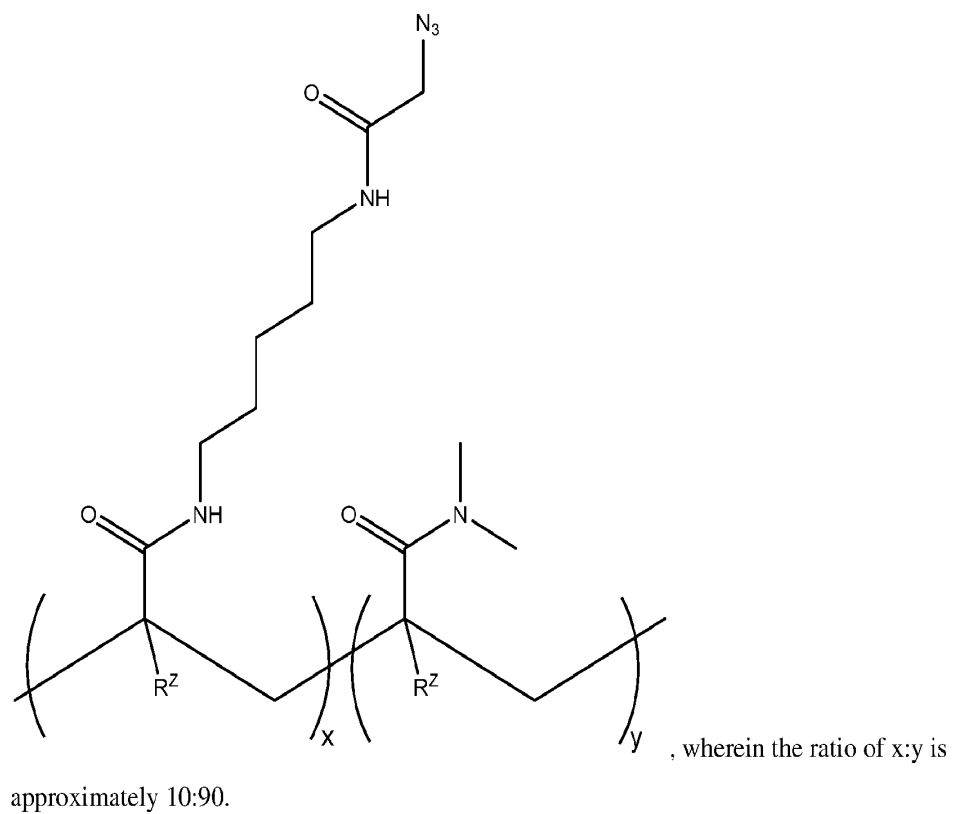


representing a number of monomers and a ratio of x:y may be from approximately 5:85 to approximately 1:99, and

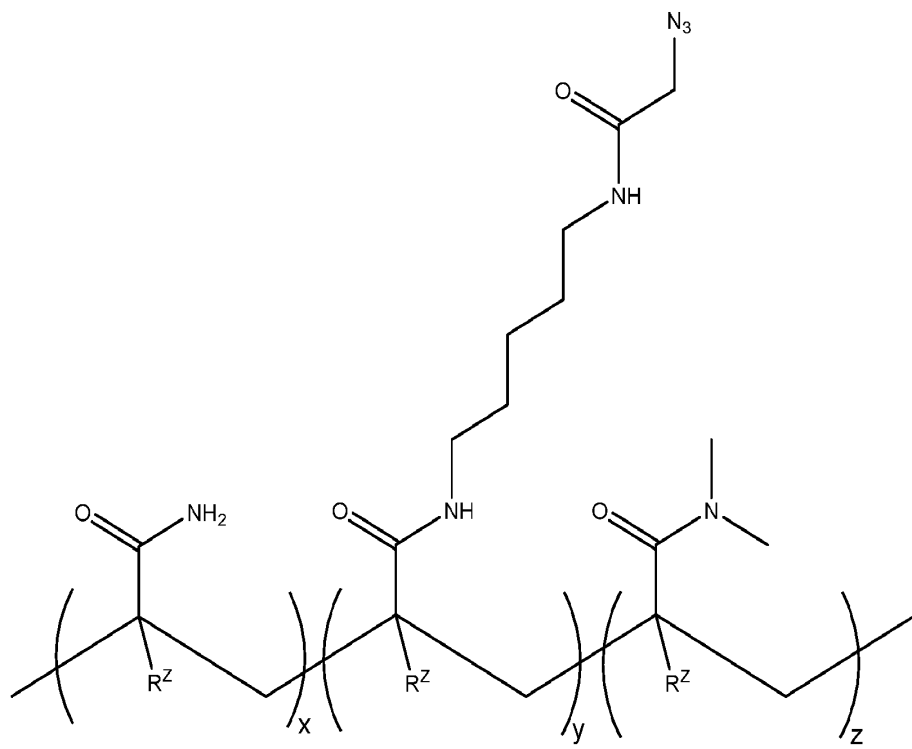


wherein x, y, and z are integers representing a number of monomers and a ratio of (x:y):z may be from approximately (85):15 to approximately (95):5, and wherein each R^Z is independently H or C_{1-4} alkyl.

10. The method of claim 9, wherein the heteropolymer comprises



11. The method of claim 9, wherein the heteropolymer comprises



wherein the ratio of x:y:z is approximately 5:85:10.

12. The method of any one of claims 1 through 10, wherein said polymerase is selected from a Klenow fragment and a Phi29 polymerase.
13. The method of any one of claims 1 through 12, wherein said polymerase is attached to the substrate.
14. The method of any one of claims 1 through 12, wherein said polymerase is not attached to the substrate.
15. The method of any one of claims 7 through 11 wherein said polymerase is selected from a Klenow fragment and a Phi29 polymerase.
16. The method of claim 15, wherein said polymerase is attached to the polymer.
17. The method of claim 15, wherein said polymerase is not attached to the polymer.
18. The method of any one of claims 1 through 17, wherein the detecting comprises measuring fluorescence emitted from test primers.
19. The method of claim 18, wherein test primers are hybridized to immobilized primers during the measuring.

20. The method of claim 18, further comprising dehybridizing the test primers from the immobilized primers before the measuring.
21. The method of claim 4, wherein the detecting comprises measuring fluorescence emitted from the test primers in response to a stimulus.
22. The method of claim 21, wherein test primers are hybridized to immobilized primers during the measuring.
23. The method of claim 21, further comprising dehybridizing the test primers from the immobilized primers before the measuring.
24. The method of any one of claims 21 through 23, further comprising comparing an amount detected of the first of the plurality of fluorescent tags to an amount detected of the second of the plurality of fluorescent tags.
25. The method of any one of claims 1 through 24, wherein a 5-prime end of at least some of the test primers does not overhang 3-prime ends of the immobilized primers.
26. The method of any one of claims 1 through 24, wherein a 5-prime end of at least some of the test primers comprises a 5-prime fluorescent tag having a 5-prime fluorescent tag spectrum, the 5-prime fluorescent spectrum differs from the fluorescent spectrum of the fluorescent tag of the nucleotide incorporated into the test primer by the extending, and detecting comprises detecting an amount of 5-prime fluorescent tag and an amount of nucleotide fluorescent tag.
27. The method of any one of claims 1 through 24, wherein at least some of the test primers comprise overhanging test primers complementary to overhung immobilized primers, wherein 5-prime ends of the overhanging test primers overhang 3-prime ends of the overhung immobilized primers when hybridized thereto before the extending, further comprising
- extending, using one nucleotide, overhung immobilized primers, wherein nucleotides incorporated into overhung immobilized primers by the extending comprise an overhung fluorescent tag having an emission spectrum detectably different from an emission spectrum of the one of a plurality of fluorescent tags incorporated into the overhanging test primer by the extending,
- detecting an amount of fluorescent immobilized primers, and
- comparing an amount of fluorescent test primers to an amount of fluorescent immobilized primers.

28. The method of any one of claims 1 through 24, wherein at least some of the test primers comprise overhanging test primers complementary to overhung immobilized primers, wherein 5-prime ends of the overhanging test primers overhang 3-prime ends of the overhung immobilized primers when hybridized thereto before the extending and comprise a test primer 5-prime fluorescent tag, further comprising

extending, using one nucleotide, overhung immobilized primers, wherein nucleotides incorporated into overhung immobilized primers by the extending comprise an overhung fluorescent tag, the test primer 5-prime fluorescent tag and the overhung fluorescent tag comprise a fluorescent tag pair when the overhanging test primers are hybridized to overhung immobilized primers after the extending of the overhung immobilized primers, and a combined fluorescence emitted by the fluorescent tag pair differs from a fluorescence emitted from the test primer 5-prime fluorescent tag and from a fluorescence emitted from the overhung fluorescent tag.

29. The method of claim 28, wherein detecting an amount of fluorescent test primers comprises detecting the combined fluorescence emitted by the fluorescent tag pair.