CLAIMS

1. A method for preparing a peptide for sequencing, comprising:

(a) contacting the peptide with a binding element to form an element-peptide complex, wherein the binding element comprises:

a reactive group that binds to a terminal amino acid of the peptide to form the element-peptide complex;

a tethering group for immobilizing the element-peptide complex to a substrate; and

a linker that provides an attachment point for a further element-peptide complex;

(b) conjugating the element-peptide complex to the substrate via the tethering group of the binding element; and

(c) cleaving the element-peptide complex from the peptide resulting in an element-amino acid complex bound to the substrate,

wherein the element-amino acid complex comprises the linker that provides the attachment point for the further element-peptide complex, wherein the further element-peptide complex is formed with the next, now terminal amino acid of the peptide.

2. The method of claim 1, further comprising repeating (a) through (c) one or more times.

3. The method of claim 2, wherein (a) through (c) are repeated for all amino acids of the peptide.

4. The method of claim 1, wherein, prior to (a), the peptide is affixed to the substrate.

5. The method of claim 4, wherein the substrate comprises a functionalized surface.

6. The method of claim 1, further comprising (d) contacting the next, now terminal amino acid of the peptide with a further binding element to form the further element-peptide complex.

7. The method of claim 6, further comprising, (e) tethering the further element-peptide complex to the linker of the element-amino acid complex of (c).

8. The method of claim 7, further comprising, (f) cleaving the further element-peptide complex from the peptide, thereby providing linked element-amino acid complexes bound to the substrate.

9. The method of claim 1, wherein the reactive group is an isothiocyanate, a phenyl isothiocyanate (PITC), an isocyanate, an acyl azide, an N-hydroxysuccinimide ester (NHS ester), a sulfonyl chloride, an aldehyde, a glyoxal, an epoxide, a carbonate, an aryl halide, an imidoesters, a carbodiimide, an anhydride, or a fluorophenyl ester.

10. The method of claim 1, wherein the linker is a charged linker.

11. The method of claim 1, further comprising detecting the amino acid of the element-amino acid complex.

12. The method of claim 11, wherein detecting the amino acid of the element-amino acid complex comprises contacting the element-amino acid complex with an element-amino acid complex binder and detecting the element-amino acid complex binder bound to the element-amino acid complex.

13. The method of claim 11, wherein detecting the amino acid of the element-amino acid complex comprises use of a nanopore.

14. The method of claim 1, further comprising performing (a) through (c) on one or more additional peptides.

15. The method according to claim 14, wherein, prior to (a), the two or more peptides are independently affixed to the substrate.

16. The method of claim 1, wherein the linker is configured to couple two or more element-amino acid complexes.