(i) a binding probe having binding specificity for the analyte, and (ii) a nucleic acid molecule; (b) denaturing at least a portion of the nucleic acid molecule or derivative thereof; and (c) detecting signals indicative of the denaturing to identify the analyte.

[0006] In some ~~embodiments~~examples, the analyte is coupled to a support. In some ~~embodiment~~examples, the analyte is coupled to the support via a capture agent immobilized on the support. In some ~~embodiment~~examples, the capture agent is an antibody. In some ~~embodiment~~examples, the binding reagent is an antibody. In some ~~embodiment~~examples, the analyte is a protein.

[0007] In some ~~embodiment~~examples, the analyte is one of a plurality of analytes in a sample, and wherein the binding reagent is one of a plurality of binding reagents. In some ~~embodiment~~examples, the method further comprises contacting an additional binding reagent with an additional analyte, which the additional binding reagent comprises: (i) an additional binding probe having binding specificity for the additional analyte, and (ii) an additional nucleic acid molecule. In some ~~embodiment~~examples, the additional nucleic acid molecule is different than the nucleic acid molecule. In some ~~embodiment~~examples, the method further comprises denaturing the additional nucleic acid molecule or derivative thereof. In some ~~embodiment~~examples, the method further comprises detecting additional signals indicative of the denaturing the additional nucleic acid or derivative thereof to identify the additional analyte. In some ~~embodiment~~examples, the method further comprises partitioning the plurality of binding reagents into a plurality of partitions.

[0008] In some ~~embodiment~~examples, the method further comprises using a microfluidic device to partition the plurality of binding reagents into the plurality of partitions. In some ~~embodiment~~examples, the method further comprises imaging one or more partitions of the plurality of partitions to detect the signals. In some ~~embodiment~~examples, the method further comprises determining a number of partitions which contain the nucleic acid molecule, wherein the number of partitions which contain the nucleic acid molecule are used to quantify the analyte.

[0009] In some ~~embodiments~~examples, the nucleic acid molecule is reversibly coupled to the binding probe. In some examples~~embodiments~~, the method further comprises, prior to (b), decoupling the nucleic acid molecule from the binding probe. In some examples~~embodiments~~, the method further comprises , prior to (b), decoupling a portion of the nucleic acid molecule from the binding probe. In some examples~~embodiments~~, subsequent to (a), the binding reagent is coupled to the analyte. In some examples~~embodiments~~, the method further comprises removing uncoupled binding reagent by washing. In some examples~~embodiments~~, the method further comprises subjecting the nucleic acid molecule to controlled heating to denature the nucleic acid molecule. In some ~~embodiment~~examples, the method further comprises, prior to (b), amplifying the nucleic acid molecule. In some ~~embodiment~~examples, the method further comprises processing the signals to generate a denaturation profile, which

denaturation profile is used to identify the analyte. In some ~~embodiment~~examples, the nucleic acid molecule comprises an intercalating dye from which the signals are derived. In some ~~embodiment~~examples, the signals are optical signals.

[0010] In some ~~embodiment~~examples, the method further comprises contacting an additional binding reagent with the analyte, which additional binding reagent comprises: (i) an additional binding probe having binding specificity for the analyte, and (ii) an additional nucleic acid molecule. In some ~~embodiment~~examples, the method further comprises contacting the nucleic acid molecule and the additional nucleic acid molecule with a splinter oligo to couple the nucleic acid molecule to the additional nucleic acid molecule. In some ~~embodiment~~examples, the method further comprises ligating the nucleic acid molecule and the additional nucleic acid molecule to generate a ligated nucleic acid molecule. In some ~~embodiment~~examples, the method further comprises, prior to (b), amplifying the ligated nucleic acid molecule.

[0011] In another aspect, the present disclosure provides system for identifying an analyte, comprising: a detection unit configured to collect and process signals for identification of the analyte; one or more processors operatively coupled to the detection unit, wherein the one or more processors are individually or collectively programmed or otherwise configured to: (i) contact a binding reagent with the analyte, which binding reagent comprises (a) a binding probe having binding specificity for the analyte, and (b) a nucleic acid molecule; (ii) denature at least a portion of the nucleic acid molecule or derivative thereof; and (iii) direct the detection unit to detect signals indicative of denaturing of the nucleic acid molecule to identify the analyte.

[0012] In some ~~embodiment~~examples, the system further comprises a support configured to couple to the analyte. In some ~~embodiment~~examples, the support comprises a capture agent immobilized on the support, and wherein the capture agent is configured to couple to the analyte. In some ~~embodiment~~examples, the capture agent is an antibody. In some ~~embodiment~~examples, the binding reagent is an antibody. In some ~~embodiment~~examples, the analyte is a protein.

[0013] In some ~~embodiment~~examples, the system further comprises a microfluidic device comprising a plurality of partitions. In some ~~embodiment~~examples, the plurality of partitions is configured to partition a mixture comprising the binding reagent. In some ~~embodiment~~examples, the detection unit is configured to image one or more partitions of the plurality of partitions. In some ~~embodiment~~examples, the system further comprises a processing unit configured to amplify the nucleic acid molecule. In some ~~embodiment~~examples, the system further comprises a heating unit configured for controlled heating of the nucleic acid molecule to denature the nucleic acid molecule. In some ~~embodiment~~examples, the one or more processors are individually or collectively programmed or otherwise configured to

generate a denaturation profile of the nucleic acid molecule, which denaturation profile is usable to identify the analyte.

[0014] Additional ~~aspect~~examples and advantages of the present disclosure will become readily apparent to those skilled in this art from the following detailed description, wherein only illustrative ~~embodiment~~examples of the present disclosure are shown and described. As will be realized, the present disclosure is capable of other and different ~~embodiment~~examples, and its several details are capable of modifications in various obvious respects, all without departing from the disclosure. Accordingly, the drawings and description are to be regarded as illustrative in nature, and not as restrictive.

INCORPORATION BY REFERENCE

[0015] All publications, patents, and patent applications mentioned in this specification are herein incorporated by reference to the same extent as if each individual publication, patent, or patent application was specifically and individually indicated to be incorporated by reference. To the extent publications and patents or patent applications incorporated by reference contradict the disclosure contained in the specification, the specification is intended to supersede or take precedence over any such contradictory material.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The novel features of the invention are set forth with particularity in the appended claims. A better understanding of the features and advantages of the present invention will be obtained by reference to the following detailed description that sets forth illustrative embodiments, in which the principles of the invention are utilized, and the accompanying drawings (also "Figure" and "FIG." herein), of which:

[0017] FIG. 1 schematically illustrates an example workflow for analyzing an analyte;

[0018] FIG. 2 schematically illustrates an example complex comprising an analyte, capture agent, and binding reagent;

[0019] FIG. 3 schematically illustrates an example workflow for analyzing an analyte;

[0020] FIGs. 4A and **4B** illustrate example denaturation profiles for multiple binding reagents; **FIG. 4A** illustrates example denaturation profiles for example samples contacted with a single binding reagent; **FIG. 4B** illustrates example denaturation profiles for example samples contacting with multiple binding reagents;

[0021] FIG. 5 schematically illustrates example identification and quantification of example analytes;