

[0249] 26. The device of item 21, wherein the array also includes antibodies against the p24 antigen of HIV.

[0250] 27. The device of item 21, wherein the array includes one or more reaction sites, wherein said reaction sites include capture molecules selected from the group consisting of HIV antigens p17, p24, p31, gp41, p51, p55, p66, gp120, gp160, p41 Type O, and p36 of HIV-2.

[0251] 28. The device of item 27, wherein the array includes antibodies against the p24 antigen of HIV.

[0252] 29. The device of item 1, 2, 3, 4, 5, 6, 7, 10, 11, 12 or 21, wherein said sample is whole blood, plasma, or serum.

[0253] 30. A device for analyzing a sample potentially including at least one analyte, the device including: a) a planar waveguide; b) a refractive volume for optically coupling light provided by a light source to the planar waveguide; and c) a plurality of capture molecules, wherein the planar waveguide and the refractive volume are integrally formed as a single piece, and wherein the planar waveguide including a first surface and a second surface that is opposite from the first surface, the plurality of capture molecules being immobilized to the first surface, the first surface including an array, the array including a first reaction site and a second reaction site, the first reaction site including at least a fragment of gp41 antigen of HIV-1, and the second reaction site including at least a fragment of p24 antigen of HIV-1.

[0254] 31. A device for analyzing a sample potentially including at least one analyte, the device including: a) a planar waveguide; b) a refractive volume for optically coupling light provided by a light source to the planar waveguide; and c) a plurality of capture molecules, wherein the planar waveguide and the refractive volume are integrally formed as a single piece, and wherein the planar waveguide including a first surface and a second surface that is opposite from the first surface, the plurality of capture molecules being immobilized to the first surface, the first surface including an array, the array including a first reaction site and a second reaction site, the first reaction site including at least a fragment of p47 of *Treponema pallidum*, and the second reaction site including at least a fragment of p17 of *Treponema pallidum*.

[0255] 32. A device for analyzing a sample potentially including at least one analyte, the device including: a) a planar waveguide; b) a refractive volume for optically coupling light provided by a light source to the planar waveguide; and c) a plurality of capture molecules, wherein the planar waveguide and the refractive volume are integrally formed as a single piece, and wherein the planar waveguide including a first surface and a second surface that is opposite from the first surface, the plurality of capture molecules being immobilized to the first surface, the first surface including an array, the array including a first reaction site and a second reaction site, the first reaction site including at least a fragment of hepatitis C virus (HCV) core antigen, and the second reaction site including an HCV antigen selected from the group consisting of HCV NS3, HCV NS4, HCV NS5, fragments thereof, and combination thereof.

[0256] 33. A device for analyzing a sample potentially including at least one analyte, the device including: a) a planar waveguide; b) a refractive volume configured for optically coupling light provided by a light source to the planar waveguide, and c) a plurality of capture molecules, wherein the planar waveguide and the refractive volume are integrally formed as a single piece, the planar waveguide including a first surface, and a second surface that is opposite from the first surface, the plurality of capture molecules being immo-

bilized to the first surface, the first surface including an array of at least two reaction sites, and wherein a volume of the sample needed for full contact with all reaction sites on the array is less than 30 microliters.

[0257] 34. A method for analyzing a sample potentially including at least one analyte, the method including: a) adding at least a portion of the sample to a device, the device including a planar waveguide, a light source, a refractive volume configured for optically coupling light provided by the light source to the planar waveguide, and a plurality of capture molecules, the planar waveguide and the refractive volume being integrally formed as a single piece, the planar waveguide including a first surface and a second surface that is opposite from the first surface, the plurality of capture molecules being immobilized to the first surface; b) allowing the sample to incubate with the plurality of capture molecules on the first surface; c) adding a detection reagent to the device, the detection reagent having been labeled with an excitable tag; and d) allowing the detection reagent to incubate with the first surface.

[0258] 35. The method of item 34, further including detecting light signal emitted by the excitable tag.

[0259] 36. The method of item 34 or 35, wherein the detection reagent is selected from the group consisting of anti-human IgG antibody and anti-human IgM antibody.

[0260] 37. The method of item 34, 35 or 36, wherein the excitable tag is a fluorophore.

[0261] 38. The method of item 34, 35, 36 or 37, wherein the amount of the sample added to the device is less than 30 microliters.

[0262] 39. A reader instrument for detection of analyte contained in a cartridge, the cartridge including a waveguide for directing illumination to an assay region thereon, the reader instrument including: a) a housing having at least one aperture for accommodating at least a portion of the cartridge; b) an illumination module attached to the housing, the illumination module being configured for providing illumination; c) imaging optics positioned between the illumination module and the cartridge, when the cartridge is inserted into the housing, the imaging optics being configured for shaping and redirecting the illumination toward the cartridge; and d) an image sensor system held within the housing, the image sensor system being immovably fixed with respect to the illumination module, and the image sensor system further having a field of view that substantially covers the assay region.

[0263] 40. The reader instrument of item 39, wherein the cartridge extends partially out of the housing in an operating position.

[0264] 41. The reader instrument of item 39 or 40, further including a door for blocking illumination potentially leaking out of the housing.

[0265] 42. The reader instrument of item 39, 40 or 41, further including light baffle elements on and around the cartridge for blocking illumination leakage during operation of the reader instrument.

[0266] 43. The reader instrument of item 39, 40, 41 or 42, wherein the illumination module is not activatable unless the cartridge is correctly inserted into the housing.

[0267] 44. The reader instrument of item 39, 40, 41, 42 or 43, wherein the imaging optics includes a beam homogenizer.