SUMMARY OF THE INVENTION

According to an aspect of the present invention, there is provided an integrated testing lateral flow device for detecting or monitoring nucleic acid amplification reactions, said device comprising: a set of printed electronic circuits, a set of display and battery, a sensor, a monitor, a reading and display unit, and one or more pH indicator dyes, wherein at least one of the printed electronic circuits is printed by using organic semiconductor materials, and wherein the device uses the pH indicator dye to generate a color change thereby detecting or monitoring the nucleic acid amplification reactions.

Disclosed herein is a diagnostic kit for a device that contains a chromatographic medium, said device comprising: a sample loading zone located upstream of a detection zone; a reporting carrier zone located between the sample loading zone and a detection zone, wherein the reporting carrier zone comprises a reporting carrier capable of forming a complex with an analyte and wherein said device contains said reporting carrier, a carrier and one or more proficient enzyme cassettes; and a detection zone, wherein said detection zone contains a capture component for the analyte and an indicator.

Disclosed herein is a diagnostic kit to detect the presence of an analyte using an enzyme-aided amplification method in a chromatographic medium, said kit comprising: an analyte as a biomarker, an entity to recognize said biomarker; a reporting carrier that has a first entity which binds to the analyte, and a capture component, wherein said biomarker is an antigen, said capture component is a second antibody that binds to the analyte at a different epitope from the first antibody.

Disclosed herein is a method for measuring a chemical or biological reaction, said method comprising: using a printed electronic device containing at least one of the electronics selected from the group circuits, display, battery, sensor, monitor, reading unit, display unit, adding of an analyte; observing the reaction; reading the result; that has a data input and data output mechanism and a power input mechanism.

Disclosed herein is a device for measuring pH changes, wherein said device comprises: a printed sensor system containing a test line, a control line and a conjugation pad.

Disclosed herein is a medical testing device, said device comprising: a printed battery, a printed sensor and a communication module to upload information, wherein said communication module uploads information to a base station.

Disclosed herein is an integrated testing lateral flow device comprising a chromatographic medium having a sample loading zone upstream from a detection zone; a reporting carrier zone; a detection zone; wherein the reporting carrier is located between the sample loading zone and the detection zone.

Disclosed herein is a kit to detect nucleic acid amplifications, said kit comprising: (a) one or more container(s), (b) amplification reagents, and (c) at least one pH indicator, wherein the pH indicator is potassium 1-hydroxyl-4-[4-(hydroxyethyl sulphonyl)-phenylazo]-naphthalene-2-sulphonate or 4-[4(2-hydroxylethanesulfonyl)-phenylazo]-2,6-dimethoxyphenol or any reactive vinylsulphonyl due or combination thereof.

Disclosed herein is a pH detection device comprising: a pH sensitive sensor component controlling circuitry for calculating signal strength and display pixel components, wherein said components are printed on dielectric materials, wherein the dielectric material is flexible plastic.

CLAIMS:

1. An integrated testing lateral flow device for detecting or monitoring nucleic acid amplification reactions, said device comprising:

a set of printed electronic circuits,

a set of display and battery,

a sensor,

a monitor,

a reading and display unit, and

one or more pH indicator dyes;

wherein at least one of the printed electronic circuits is printed by using organic semiconductor materials, and wherein the device uses the pH indicator dye to generate a color change thereby detecting or monitoring the nucleic acid amplification reactions.

2. The integrated testing lateral flow device according to claim 1, wherein the organic semiconductor materials are poly(3-hexylthiophene), pentacene, polytriarylamine, 5',5-bis-(7-dodecyl-9H-fluoren-2-yl)-2,2'-bithiopene, naphthalate, poly(4,4' didecylbithiopene-co-2,5-thieno[2,3-b] thiophene, polyaniline or combinations thereof.

3. The integrated testing lateral flow device according to claim 1, wherein the pH indicator dye is in solution, immobilized on one or more 3D structures, immobilized in a reaction chamber or vessel, or combinations thereof.

4. The integrated testing lateral flow device according to claim 3, wherein the pH indicator dye is immobilized on at least one 3D structure.

5. The integrated testing lateral flow device according to claim 1, wherein the printed electronic circuits are nanoparticles, nanotubes, graphene or combinations thereof, and wherein the printed electronic circuits are printed by atomic layer deposition, vapour deposition, inject printing, roll-to-roll printing, screen printing or combinations thereof.

6. The integrated testing lateral flow device according to claim 1, additionally comprising: one or more transistors, controlling circuits, signal circuits, display circuits, batteries, and input and output circuits for data recording and power sourcing.