automated fluidic system that provides an end-user control over selection and flow parameters for reagent delivery to cells in an analysis chamber, as well as selection of gases in equilibrium with various reagents and solutions. Additionally, user-selected precision temperature control of ChemFET devices, reagents and solutions, as well as the analysis compartment provide consistency in the cell analysis system environment.

[0005a] According to a first aspect of the present disclosure, there is provided a sensor device comprising: an array of ChemFET sensors mounted on a substrate, wherein the ChemFET sensors have a pitch of between 850 nm to 3.3 μ and an input capacitance of between 1 fF to 10 fF; and a frame mounted on the substrate; the frame having an inner wall surface that is a sealing surface enabling reversible formation of a flow cell.

[0005b] According to a second aspect of the present disclosure, there is provided an analysis system comprising: an apparatus for reversibly coupling an interface device to the sensor device of the first aspect, wherein the interface device includes a fluidic interface between a fluid source and a flow cell formed upon coupling the interface device to the sensor device; a thermal control assembly for thermal regulation of the sensor device; a reference electrode in fluid communication with the sensor device, wherein the reference electrode provides a stable reference potential to an array of sensors of the sensor array device; and a fluidic system configured for controllable liquid deliver through the flow cell.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The novel features of the present disclosure are set forth with particularity in the appended claims. A better understanding of the features and advantages of what is disclosed herein will be obtained by reference to the following detailed description that sets forth illustration of the features and advantages of systems, devices and methods for cell analysis, in which the principles of the present disclosure are utilized, and the accompanying drawings of which:

[0007] FIG. 1A is a block diagram that illustrates generally various components of a cell analysis system of the present disclosure.

[0008] FIG. 1B is a block diagram that illustrates generally the integration of various elements of a fluidic system with a chip interface device and a chip device of the present disclosure.

[0009] FIG.2 is an exploded view that illustrates generally an a sensor array device used in a cell analysis system of the present disclosure.

[0010] FIG. 3 is a perspective section view of a sensor array device that illustrates generally various aspects of a portion of a flow cell chamber defined by a sensor array device.

[0011] FIG. 4A is a perspective view that illustrates generally an a sensor array device used in a cell analysis system of the present disclosure capable of providing various segments of a ChemFET for plating cell samples. FIG. 4B is an exploded view of an upper section of FIG. 4A.

[0012] FIG. 5A illustrates generally an electrical model of a cell on a ChemFET sensor array of the present disclosure.

[0013] FIG. 5B is a schematic section view of a cell on a sensor chip that illustrates generally structural components of a ChemFET sensor without microwells used for cell analysis.

[0014] FIG. 5C is a schematic section view of a cell on a sensor chip that illustrates generally structural components of a ChemFET sensor with microwells used for cell analysis.