



TIXIER-MITA LAB.

[Bio CMOS/MEMS Platforms]

Centre for International Research on MicroNano Mechatronics

<http://toshi.iis.u-tokyo.ac.jp/toshilab/?Agnes%20Tixier-Mita>

Electrical Systems Platforms for Cells Biology Purposes

Bio CMOS/MEMS Platforms

Platforms for multi-approach investigation for analyzing, manipulating and sensing biological cells.

Precise and sensitive tools are needed to investigate further in the cell biology field: to track disease, develop new drugs, or for more fundamental understanding of biological phenomena. Here, new tools for biological cells and chemical analyses are proposed. They are hybrid systems with integrated electronics, micro-fluidics, and sensors. They allow a multitude of investigation approaches: electrical, optical, chemical and biological.

- ◆ Electronics integration by LSI or TFT technology: possibility of dense array of independently controllable electronic components.
- ◆ Miniaturization and micro-structurization, thanks to micro-fabrication: improvement of portability and sensitivity.
- ◆ Possibility of embedded micro-fluidics inside LSI: to improve the compatibility between biological environment and microelectronics.

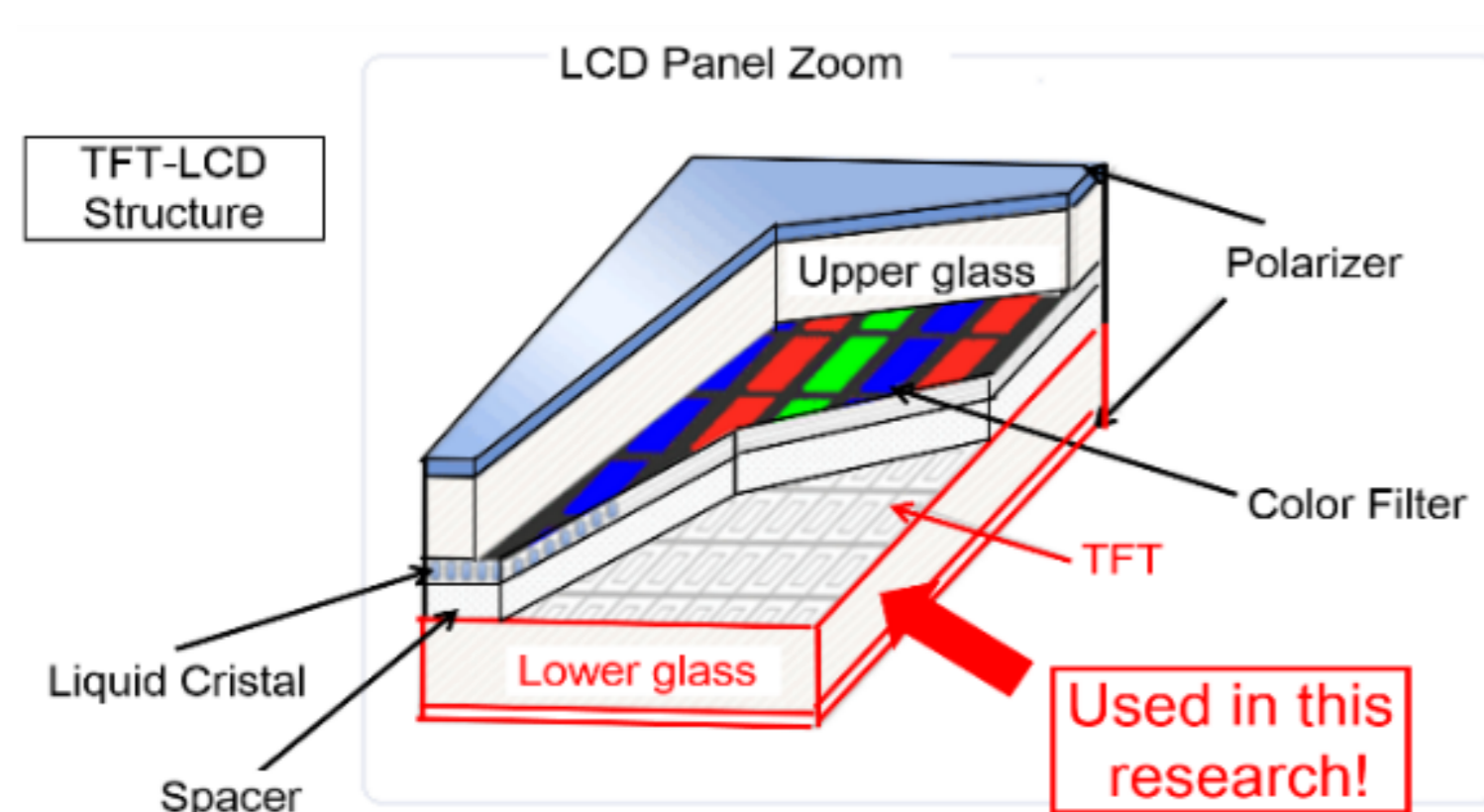


Fig.1: Cross section of a TFT/LCD display used as a substrate for particles and cells manipulation

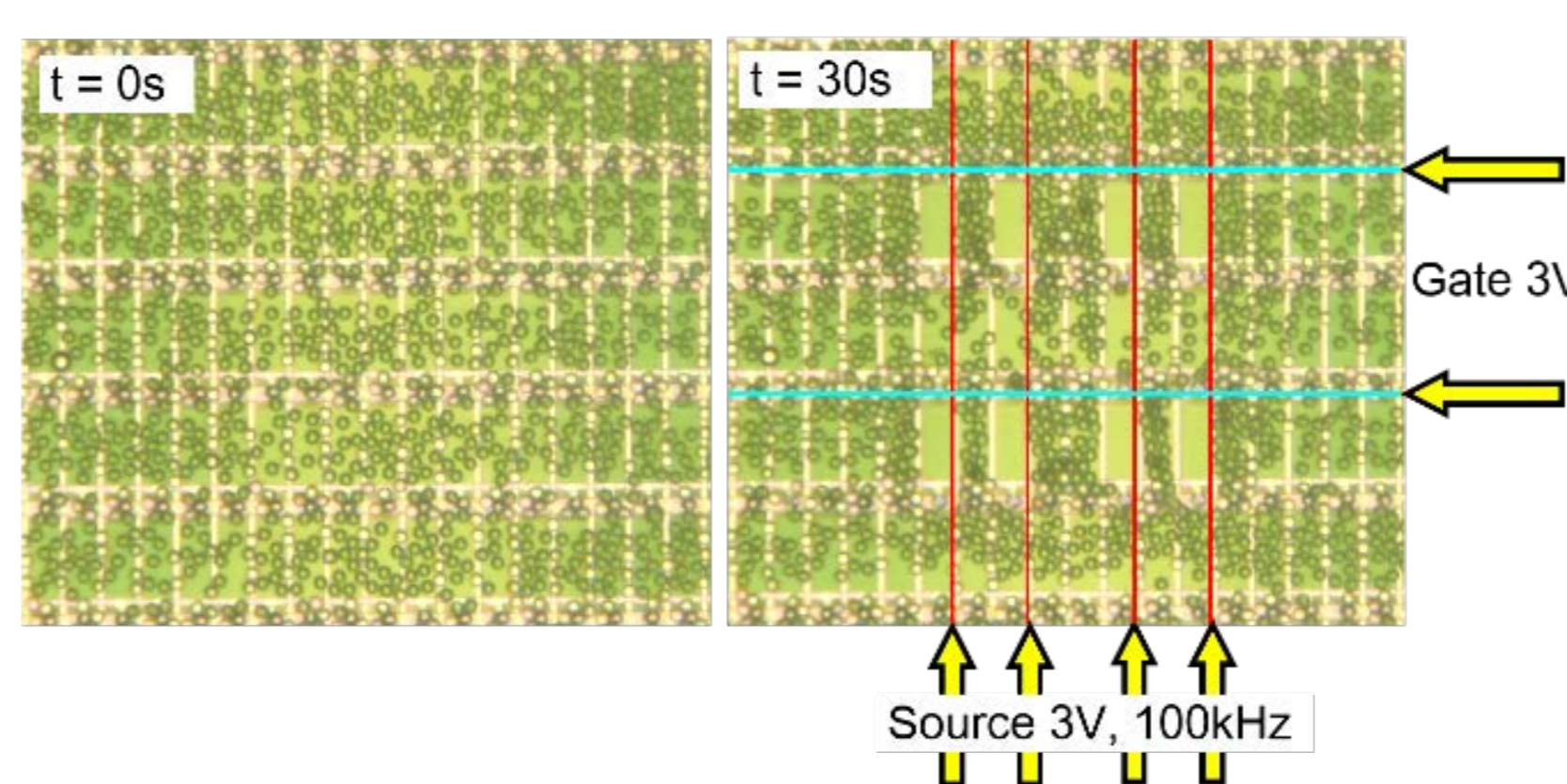


Fig.2: Results of micro-beads manipulation on the TFT substrate, by dielectrophoresis.

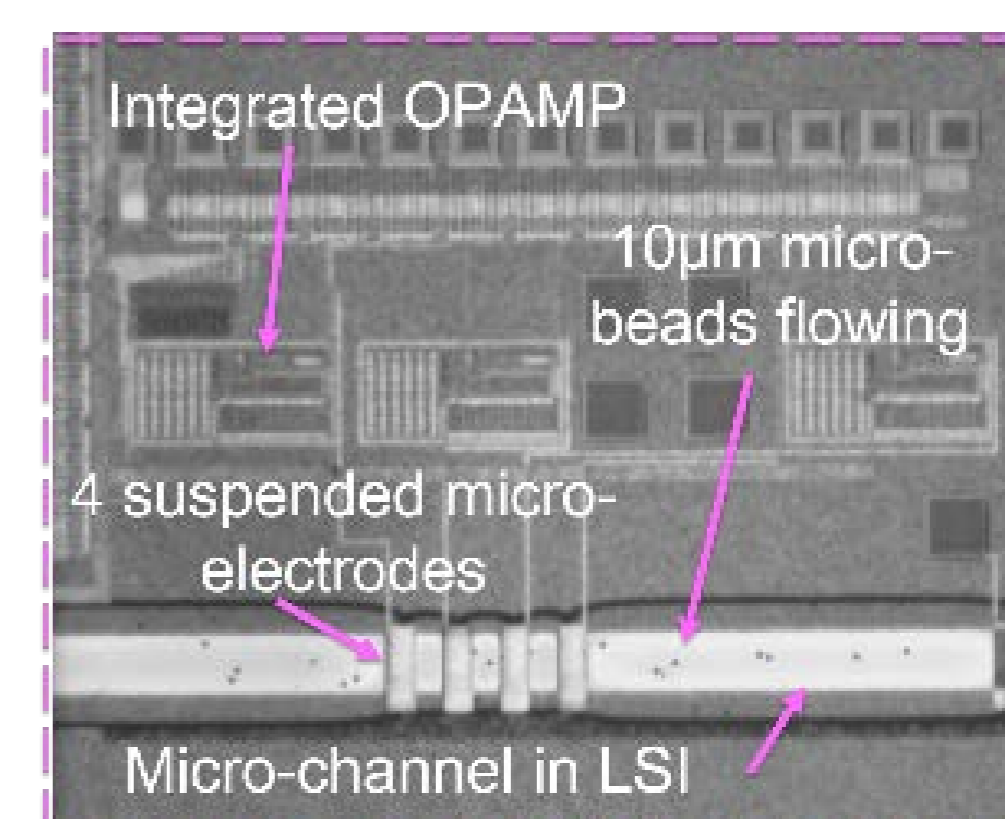


Fig.3: Micro-channel embedded inside an LSI device for cells characterization.

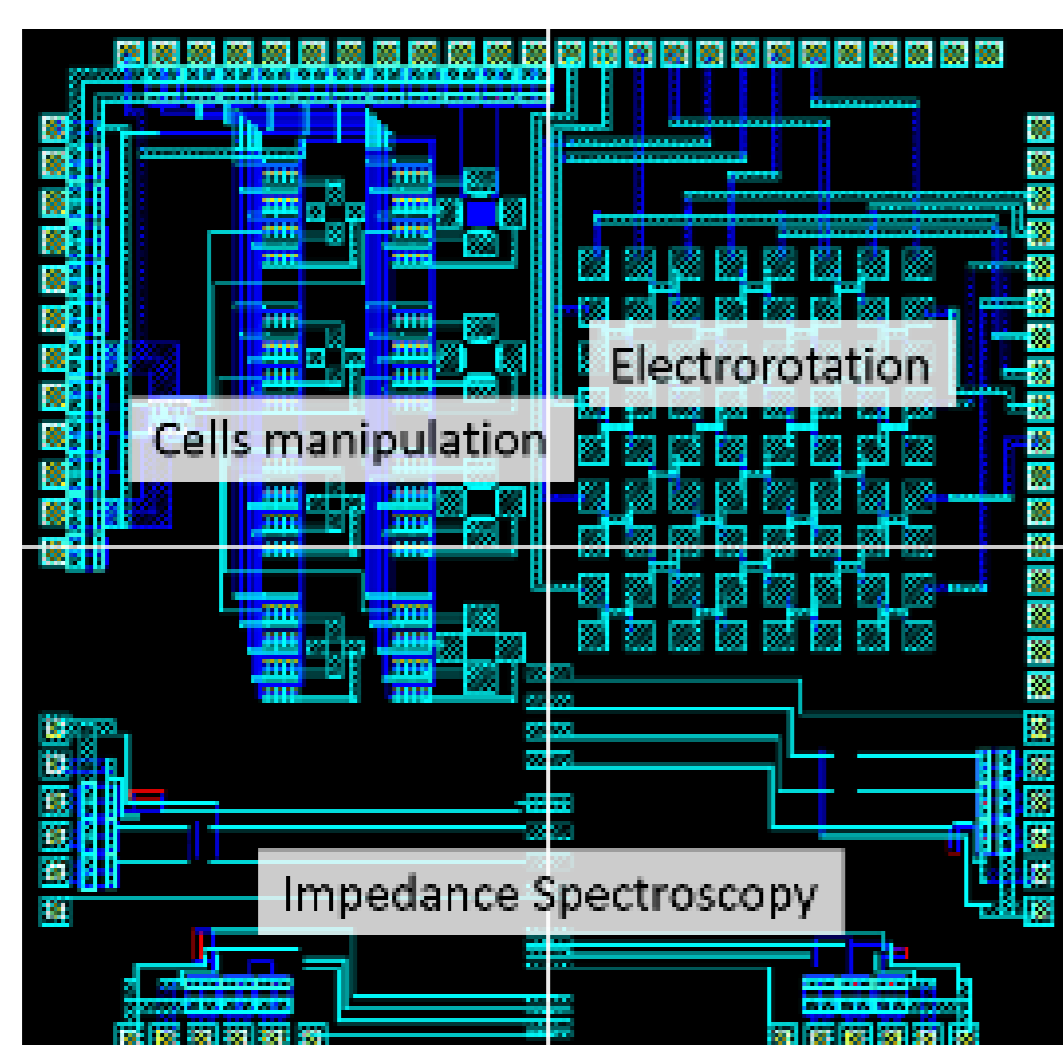


Fig.4: LSI device for cells manipulation and sensing.

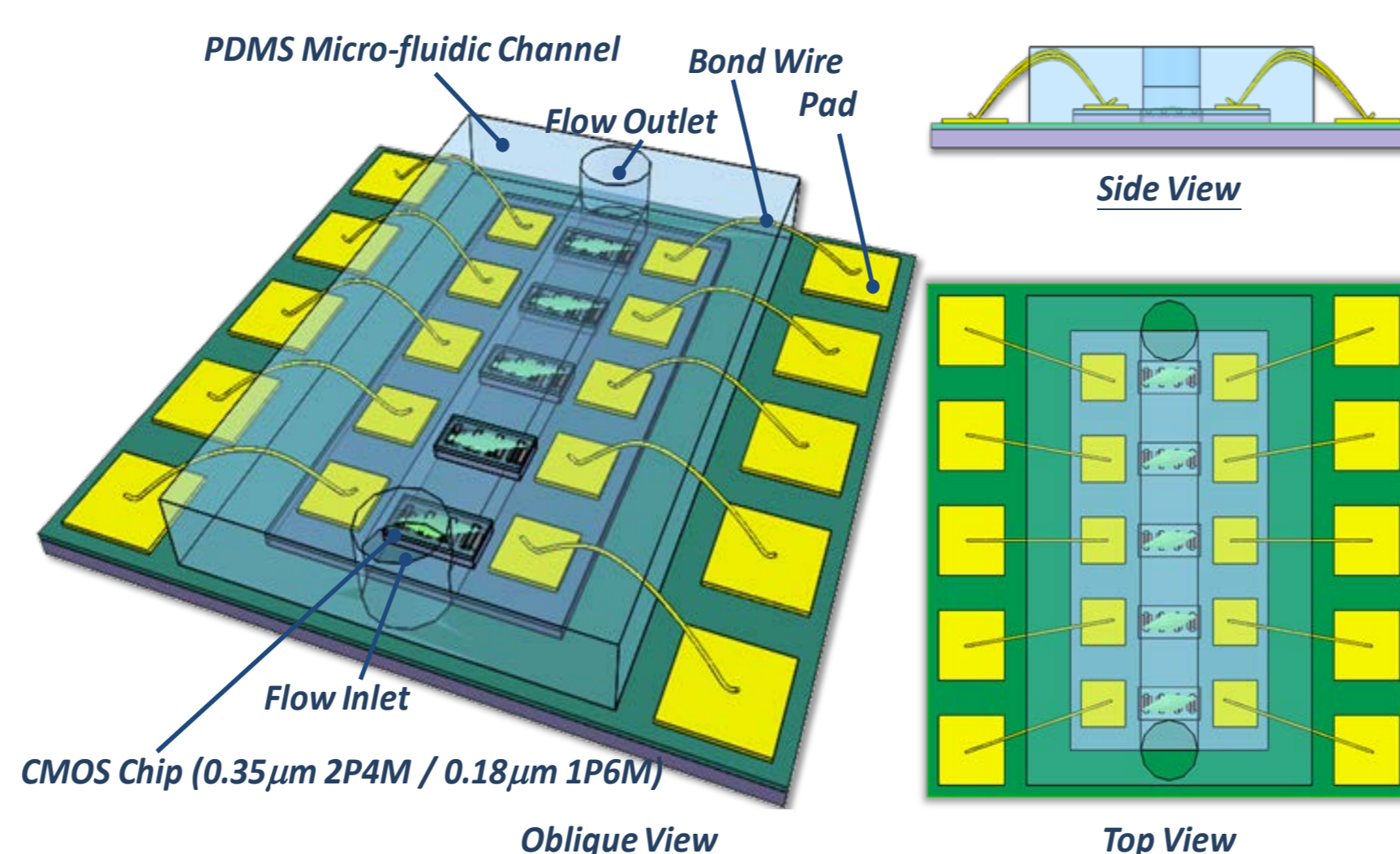


Fig.5: Neurons on LSI chip as an interface with an artificial neuron system.

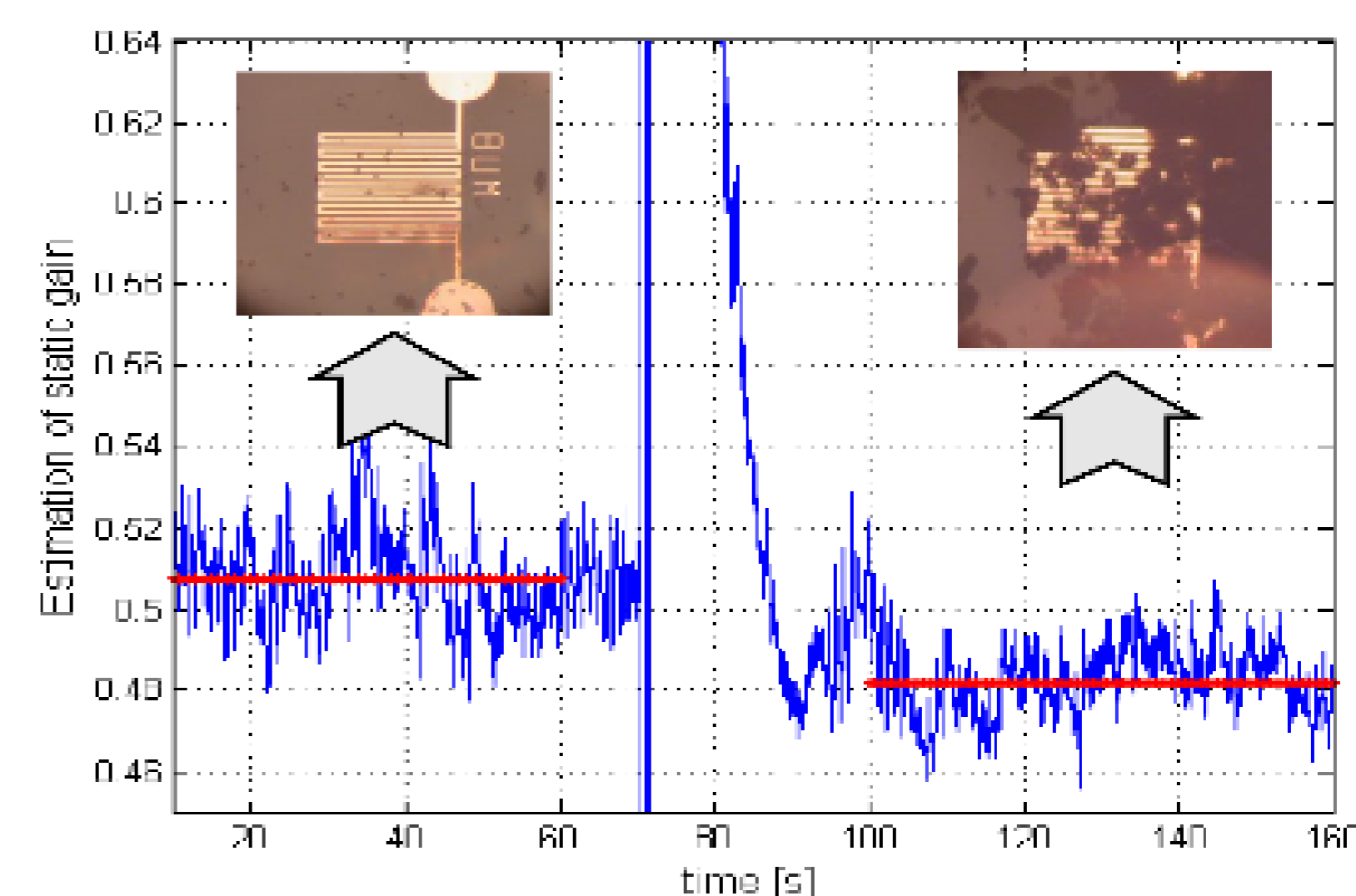


Fig.6: Thermal sensing used to monitor cells growth.