Sensor test system by the impedance bridge with thin films deposition

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The present work describes a gas detection system using nanostructured thin films. The sensor is constituted of aurum interdigitated electrodes with 5, 10, 15 and 20 µm of width and spacing among the digits, disposed in the impedance bridge-like form onto Al_2O_3 substrate, shown in figure 1. The sensor, which one is coupled in a gas chamber onto a thermoelectric cell for temperature control, is connected to the conditioning and signal circuits of the sensor and, also, to the commercial temperature sensor by printed circuits. To acquire the data, it was used a virtual instrument developed through Labview® platform. A system picture is shown in Figure 2. A sinusoidal voltage with 1 kHz of frequency and 1 V of amplitude was applied onto the input bridge terminals. Bridge disequilibrium by the other two terminals was observed, with a fast response for the film deposited onto the sensor (2 resin layers TiO_2:WO_3, 360 nm of thickness). A good reproducibility in the capacitors fabrication [1] and the easy adjustment of sensibility turn this system a promising dispositive for tests with other sorts of films. Furthermore, this system can contribute for better knowledge of the phenomenon and theoretical model construction [2]. Work supported by CAPES, CNPq Universal Project and INCT NAMITEC.

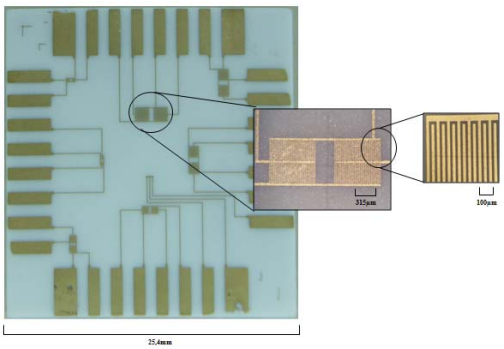

Figure 1. Detail of the sensor plate, which one the thin film is deposited.

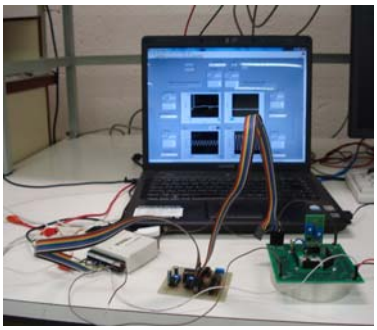

Figure 2. Sensor test system.

[1] **Costa, J. S.; Flacker, A.; Fruett F.; A new fabrication technique of planar metallic microstructures on alumina substrate.** 24th Symposium on Microelectronics Technology 2009, EUA; The Electromechanical Society, 2009, Vol. 23, p. 327-334.
[2] **Savu, R.; Ponce, M. A.; Joanni, E.; Bueno, P. R.; Castro, M.; Cilense, M.; Varela, J. A.; Longo, E.; Grain size effect on the electrical response of SnO_2 thin and thick film gas sensors.** Materials Research 2009, Vol. 12, No. 1, p. 83-87.

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