

Tesi su proposta

CORCEL – Corrosion Evaluation Instrument by Impedance Measurement in Cell Cultures

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Place of development: Hospital de Clínicas, Universidad de la República, Uruguay

Timing: 1 month preparation in Torino & 5 months at NIB, prior to defense in POLITO July 2020

After the development of an original impedance meter at POLITO capable of impedance measurements spanning 7 orders of magnitude, ODINO, twenty years ago, there is the need for a new instrument to measure impedance of materials under test for corrosion. Of particular interest is the characterization of known materials in cell cultures, as a first step to equip the Cell Culture Laboratory of Montevideo with such capability.

The specifications of CORCEL are an instrument under custom software control and integrated in the laboratory local area network capable of spectroscopic ($10E-2$ to $10E5$ Hz) impedance measurements from $10E2$ to $10E9$ ohm. CORCEL includes platinum and silver-silver chloride electrodes, a custom circuit board for the current source and a miniature camera to obtain images of the sample. A Raspberry© board may be recommended, albeit a comparison of available technology and OEM design is required. CORCEL makes the results of measurements available in XML and PDF formats for further external management. CORCEL will be incipiently tried measuring known impedances and precision resistors, as well as first measurements of the same elements in cell cultures.

The “laurea magistrale” thesis starts with the study of previous instruments ODINO at POLITO and IMPEMAT/IMPETOM at NIB, the analysis of the problem including cell culture, electrodes and miniature cameras as building blocks, all leading to a detailed specification of CORCEL. Prototyping with standard elements, programming, construction, documentation and testing follow, prior to the writing of a paper and the preparation of the written thesis volume to be defended at POLITO.