

## **SENSING AND TACTILE ARTIFICIAL MUSCLES: THEORETICAL DESCRIPTION OF ARTIFICIAL PROPRIOCEPTION**

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If life is chemistry, why Chemical Kinetic models cannot quantitatively describe life functions, as proprioception or any other brain function? Here we will consider conducting polymers as soft, wet and reactive electrochemical materials constituted by macromolecular electrochemical multi-step motors: some of the basic components of functional organs (muscles, ionic channels in neurons,...). They allow the development of artificial (electrochemical) muscles, tactile muscles and muscles sensing by themselves, and simultaneously: chemical, thermal, mechanical or electrical working conditions. Actuating and sensing signals are present simultaneously in the only two connecting wires, replicating muscle-brain-motor neuron and sensory neuron. From the basic equation of the electrochemical kinetics a basic proprioception description is proposed and checked.

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Chemist from the University of Oviedo (1974),

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I have published over 350 indexed papers, book chapters and books. I have supervised 30 doctoral thesis.

Promoter and first president of CIDETEC (1997), a center for the transfer of electrochemical technologies (more than 200 workers, over 100 doctors) located at the technological park of San Sebastian.

Research interest: Corrosion and corrosion prevention. Electrochemistry of conducting polymers (synthesis kinetics, electrochemical behavior, oxidation/reduction kinetic models, conformational relaxation model, biomimetic applications and biomimetic models), electrochemistry of carbon nanotubes and graphenes.