

Si-nanowire field effect transistors to probe organized neuron based systems

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ABSTRACT. We present transport properties of silicon nanowires field effect transistors realized on SOI substrates and their application to probe electrical activity of biological objects. Devices are sensitive to short and weak voltage pulses (ms, mV) applied in an electrolyte solution, allowing a future efficient detection of neuronal activity. For that purpose, the organized growth of neuronal cells along chosen patterns has been obtained, leading to an accurate coupling with silicon nanowire field effect transistors. Both network architectures, neural and semiconducting, have been designed to study some aspects of the propagation and the processing of information by the nervous system.