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Over the past twenty years, the electrografting has been steadily studied in order to tailor the properties of inorganic surfaces by thin adhering polymer films. This thesis aims at devising and developing biosensors on the basis of the electrografting process. Several targets have been considered. In the first part of this work, a reactive coating has been synthesized in order to immobilize an enzyme and a redox mediator. For making the biosensor biocompatible, hydrophilic macromonomers based on poly(ethylene glycol) have been electrografted. Finally, a glucose sensor has been prepared by combining highly hydrophilic and conductive films. The recycling of the sensor has been considered. Two thermo-responsive polymers have been investigated: poly(*N*-isopropyl acrylamide) (PNIPAM) and poly(methyl vinyl ether) (PMVE). Finally, the miniaturization of the biosensor has been targeted by electrografting the reactive films onto AFM probes. This novel tool opens the way to a new generation of miniaturized sensors.