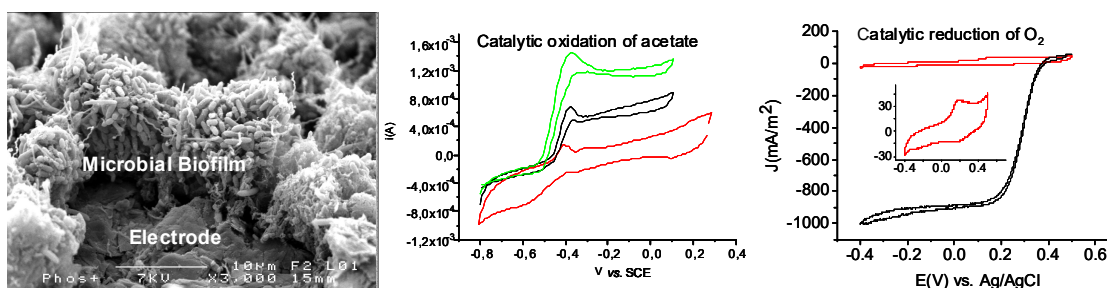


Bacteria as Living Catalysts at Modified Electrodes: Mechanism and Applications

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The reductionist biomimetic synthesis of active sites of enzymes often fails to produce simple artificial catalysts that compete with the performance and selectivity of enzymes.¹ The direct use of extracted and isolated enzymes at electrodes is possible but suffer from poor catalytic stability in time.² I will discuss the use of living micro-organisms as electrode catalysts (SEM micrograph below).² We will address the underlying metabolic mechanisms for exo-cellular electron transfer at anodes³ (e.g. oxidation of acetate) and at cathodes⁴ (e.g. reduction of dioxygen). One of our interests in the field of bioelectrochemical systems is the tailoring of the microbial-electrode interface through surface grafting in order to improve the development of electroactive biofilm and its electrical connection.³ Several examples of surface modification involving electrostatic or more specific interactions will be presented. Possible applications in energy conversion, bioremediation or sensing will be put forward.⁵



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