Supporting information

Nanomotor-based Biocatalytic Patterning of Helical Metal Microstructures

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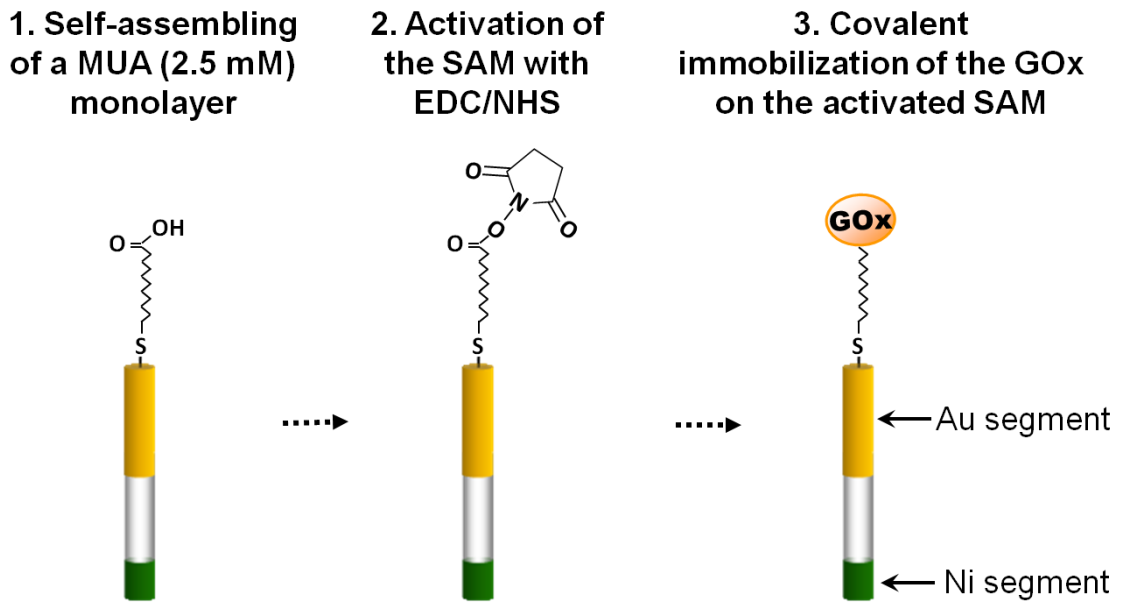
SI Video 1. Movement of a flexible GOx-Au/Ag_{Flex}/Ni nanowire in the developing solution containing 10 mM glucose and 0.3 mM $AuCl_4^-$. Conditions, as in Figure 1.



SI Figure 1. *Schematic representation of the surface chemistry involved in the magnetic swimmer modification with GOx.*

Residual GOx enzymatic activity remained after membrane dissolution

In order to corroborate that the enzymatic activity of the GOx immobilized on the nanomotors survived the harsh conditions during membrane dissolution we performed additional electrochemical experiments by immobilizing the enzyme, using the same protocol followed for bio-functionalization of the nanowires, on Au/SPEs. These Au/SPEs include a Ag pseudoreference electrode and a Au counter electrode. After immobilization of the enzyme, the electrodes were washed and dried and a 10 μL drop of a 0.3 M NaOH solution was placed on the GOx-modified Au/SPEs surface and incubated during 24 h at 4 ºC in an humidified chamber. After washing and drying chronoamperometric detection was performed by placing a 50 μL drop of a mixture containing 1 mM TMB, 1 mM glucose and 136.4 U mL^{-1} HRP (in phosphate buffer 0.1

M pH 7.4) on the sensor, stepping the potential to -200 mV (vs the Ag pseudoreference electrode), and sampling the resulting current at different times.

By comparison of the current values obtained over GOx-modified Au/SPEs exposed or not to the 0.3 M NaOH solution allows to conclude that the enzyme retained approximately the 23.5 % (mean value of 5 independent experiments) of its original activity after its exposure to the harsh basic conditions required for dissolving the membrane. The obtained results are in agreement with the reported survival of HRP also to these harsh conditions.[22]