

## HyCoRod: IF-MSCA, n°704098, 2016-2018

### Hybrid Co-based nanorods for biosensing and catalysis

The H2020 EU Research and Innovation programme identifies energy efficiency, nanotechnologies, advanced materials and biotechnology as important areas of research. Multifunctional nanostructures combine materials with different physical and chemical properties on a single nano-object. Nanostructured hybrids comprising a magnetic component can be potentially applied in both day to day and high tech applications such as magnetic recording, permanent magnets and colossal magnetoresistors, to spintronics, biotechnology (drug delivery, MRI, hyperthermia) and catalysis (recoverable catalysts, nanoheaters).

HyCoRod project aimed at tailoring the physical and chemical properties of metallic cobalt nanorods (NR) by combining them with two different metals for two important applications: (i) cobalt-gold for *in vitro* biodiagnostics and magneto-optical properties (MO) and (ii) cobalt-nickel for magnetically induced catalysis. The first main objective of HyCoRod was to improve the detection limit (up to subfemtomolar range) of analyte molecules, using a magneto-optical based detection method. For this, it is necessary to enhance the thickness and conformity of the Au shell, in order to boost their absorption and scattering signals by an expected factor of 50 and 2000, respectively. The second objective was to study the MO properties of Co@Au NRs. Finally the third objective was to evaluate the potential of Ni-containing Co NRs in magnetically induced Fischer Tropsch synthesis (FTS). Controlling the location and content of nickel would allow modulating both magnetic and catalytic properties of these NRs and establish a structure-property correlation.

