

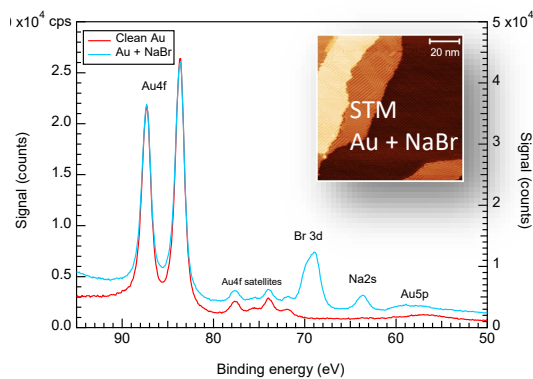
**Title:** Work function tuning of gold by ultrathin film halide deposition

**Keywords:** x-ray/ups photoelectron spectroscopy, surface science, work function

**Scientific description:**

Tuning of electronic properties of solids can be achieved by specific modification of their surface chemistry. In particular, the deposition of an ultrathin dielectric film of halides can induce a modification of the bulk material work function which can be increased or lowered depending on the interface and material properties. This work function change is related to the modification of the electronic density spatial distribution at the interface induced by the presence of the adsorbed adatom.

The objective of this internship is to perform a complete and systematic experimental investigation of the gold work function modification after deposition of an ultrathin film of NaCl. A similar study has already been performed using NaBr (see figure). The gold monocrystal will be exposed to NaCl using an evaporation source in ultra-high vacuum conditions. The thickness of the effective ultrathin layer and the overall work function will be evaluated by x-ray and ultraviolet photoelectron spectroscopy (XPS/UPS) respectively. The results will be analysed using a careful fitting of the resulting spectra using a dedicated software.



The master student will be in charge of the experimental measurements and the consecutive data analysis which will be performed at the INSP (Institut des Nanosciences de Paris) laboratory on a dedicated XPS/UPS setup. He will also participate to complementary scanning tunnelling microscopy (STM) measurements which will inform on the sample properties at the atomic scale level.

**Techniques/methods in use:** XPS, UPS, LEED, STM

**Applicant skills:** Good background in material science and solid-state physics with a strong taste for experiments.

**Industrial partnership:** N

**Internship supervisor(s)** (name, email, phone, webmail):

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**Internship location:**

Institut des Nanosciences de Paris, Campus Pierre et Marie Curie

**Possibility for a Doctoral thesis:** N