

Post-doc “Metal nanoalloys/polymer Nanocomposite coatings project”

Position: Research Engineer M/F in physical characterization of nanomaterials-nanoparticles

This offer is available in on: <https://emploi.cnrs.fr/Offres/CDD/UMR7374-NICNOU-017/Default.aspx?lang=EN>

Application Deadline : 03 September 2022

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General information

Reference : UMR7374-NICNOU-017

Workplace : ICMN lab – ORLEANS, FRANCE

Date of publication : Wednesday, July 20, 2022

Type of Contract : FTC Technical / Administrative

Contract Period : 12 months with 6 additional months

Expected date of employment : 1 October 2022

Proportion of work : Full time

Remuneration : Between 2545 € and 2730 € gross per month depending on professional experience

Desired level of education : PhD

Missions

The objective is to design and characterize multifunctional metal/polymer nanocomposite coatings based on noble metal nanoparticles (Ag, Au, Pt) in a polymeric matrix. The idea is to implement elaboration processes allowing to control the morphology (size and shape) of the nanoparticles, the composition of the bimetallic NPs: alloys and/or core/shell (Au-Ag, Ag-Pt) and also the organization of these particles in the polymeric matrix: 3D (in the volume) or 2D in thin coatings in order to modulate the plasmonic resonance properties and the final properties of the coatings. The physico-chemical and structural characterizations of the coatings will be performed by transmission and scanning electron microscopy (TEM and SEM) and by small and wide angle X-ray scattering (GISAXS, XRD) for morphology and structure as well as by complementary approaches by UV-Vis, FTIR and XPS spectroscopies for the measurement of the absorption (LSPR) and the chemical state of the coating constituents

This study will be carried out in partnership with the researchers in charge of the associated scientific project of the research units: ICMN and CEMHTI.

Activities

The engineer/researcher will be in charge of characterization works and will be associated with the preparation of nanocomposite coatings, in particular on the following points

- Implementing one or more experimental techniques leading to knowledge about the nature and properties of the studied material, including by: TEM -SEM and GISAXS, XRD, UV-Vis, FTIR

and XPS spectroscopies.

- Define a set of experimental protocols, adapted to the coatings developed and to the aims of the scientific project
- Carry out or supervise the conduct of the experiments, process the experimental data, interpret the results in relation to the research objectives
- Manage all or part of the research project

In addition to carrying out measurements, the engineer will have to, in association with the researchers

- Participate and present the results at meetings with partners
- Participate and present the results at conferences in the field and valorize these results in the form of publications

Skills

- In-depth knowledge of materials physics, surface physics and chemistry
- Expertise in characterization methods of surfaces/thin films/nanostructures by electron microscopy, small angle scattering, X-ray diffraction, and spectroscopies (absorption-plasmon resonance, XPS...)
- Knowledge in the field of metallic nanoparticles
- Skills in data processing and analysis
- Good oral and written English language skills
- Pedagogical skills for oral presentation of results
- Writing skills for reports and publications
- Autonomy, organizational skills, teamwork
- Written and oral presentation skills
- Ability to work in a team (internal and external to the laboratory)-

Work Context

The ICMN laboratory is a research laboratory of the CNRS (French national centre of scientific research) and the University of Orléans, France whose activities are oriented towards the study of nanostructured and/or heterogeneous materials which include supported nanostructures, porous media and nanomaterials. The laboratory develops dedicated instrumentation allowing investigations under radiation (X-rays, UV-Visible, IR...), in situ in controlled environment (temperature, liquid, gas, vacuum/ultravacuum...) of materials. (<http://www.icmn.cnrs-orleans.fr/?-Plateforme-instrumentale-11->)

The ICMN is attached to the CNRS Institute of Physics and has about 60 staff members. It is located on the CNRS site in Orléans.

The person recruited will interact directly with the project partners, technical staff and researchers of the ICMN laboratory, the CEMHTI laboratory and the Soleil synchrotron.

Additional Information

12 month contract, renewable for an additional 6 months.

The starting date will be defined between October 1 and December 1, 2022.

Level of education: PhD or minimum 5-years university degree.

References

https://scholar.google.com/citations?hl=fr&user=IpQNMGsAAAAJ&view_op=list_works&sortby=pubdate