Invitation for PhD Defense of Hao-Zheng YU

Dear colleagues,

I sincerely invite you to attend my thesis defense with the title:

Multifunctional Nanostructured Interfaces for Electrochemical Catalysis

The defense will be at **14:00 on 21 July 2023** (this Friday) in **Room 774 (7th floor), building Lavoisier**, 15 rue Jean-Antoine de Baïf, 75013 Paris. Afterward, we will have a drink in the same room.

ZOOM Meeting:
https://u-paris.zoom.us/j/83052702294?pwd=YkF4T2IzdVV6VnFkd2l5NWJOZ2xEZz09
Meeting ID: 830 5270 2294
Passcode: 20230721

In front of jury composed of:

Dr. Christelle Gautier	University of Angers	Reviewer
Dr. Yann Leroux	University of Rennes 1	Reviewer
Prof. Souad Ammar	Paris Cité University	Examiner
Prof. Dodzi Zigah	University of Poitiers	Examiner
Dr. Jalal Ghilane	Paris Cité University	Supervisor

Multifunctional Nanostructured Interfaces for Electrochemical Catalysis

Abstract:

Cathodic activation is one of the surface modification methods to design the electrode materials in a dry organic electrolytic solvent, which involves the electron transfer process concomitant with the insertion of the supporting electrolyte cations. This process has been observed with different electrode materials including glassy carbon, graphite, platinum, and more recently semi-conductor e.g., ITO.

The objective aim of this thesis is to investigate the cathodic activation of carbon-based electrodes and their use as a platform for the spontaneous growth of metallic nanoparticles. The main goal will be to understand the intercalation of the supporting electrolyte cation (effect of the nature of the cation, alkaline-earth metal ions, and surfactant) in terms of morphology, surface composition, and swelling. Next, the self-reducing power of the cathodically activated electrode, as well as exfoliating the graphite rod using the cathodic activation to generate the graphite nanoparticles and graphene flakes, will be used to perform self-reduction of metallic salt. The physicochemical properties of the new surfaces were investigated by SEM, XPS, and electrochemical studies. Finally, the generated materials will be tested for the electrochemical activation of small molecules, for example, H^+ for HER.

Keywords:

Electrochemical catalysis, Multifunctional nanostructured interfaces, Cathodic activation, Hydrogen evolution reaction