المدرسة الوطنية للمهندسين بتونس

Ecole Nationale d'Ingénieurs de Tunis

Photovoltaics & Semiconductor Materials Laboratory

Tunis 04 May 2021

A Project Proposal for Postdoctoral position within STI doctoral school at ENIT

***Supervisor**: Dr. Fatma Chaabouni* fatma.chaabouni@enit.rnu.tn

Structure de recherche : Laboratoire de Photovoltaïque et Matériaux Semi-conducteurs - ENIT - Université Tunis El Manar, BP 37, Le belvédère 1002-Tunis.

Elaboration and optimization of physicochemical properties of Zinc tungstate thin films and their application as a photocatalyst for the effective degradation of organic pollutants.

Environmental pollution is one of the biggest problems facing the world today. Indeed, the world has seen a growth and a continuous development of global industrialization, but unfortunately, this growth has also been accompanied by a very strong degradation of the environment. The protection of natural resources has therefore become a priority, especially that of water, because it influences our survival and the preservation of our planet. For this reason, the development of various methods of water treatment and pollution control has become very essential. Among these methods, photocatalysis appears to be an effective technique for this type of application. Indeed, photocatalysis is a combination of photochemistry and catalysis. The reaction is photochemical because it involves the presence of light and catalytic because it takes place on the surface of a catalyst called in this case a photocatalyst. It allows, in fact, to lead to the complete oxidation of most organic pollutants at room temperature and under atmospheric pressure.

Today, abundant semiconductors based photocatalysts are attracting an extensive interest as an effective solution for the purification of wastewater and the decomposition of volatile organic compounds. It is an attractive way because it is environmentally friendly and low in cost. Those amazing photocatalysts include TiO_2 (3.3 eV), ZnO (3.4 eV), ZnS (3.7 eV), $ZnWO_4$ (3.7 eV), CdS (2.4 eV), etc. Among these semiconductors, $ZnWO_4$ is one of the most potential and splendid photocatalysts, and it is regarded as a reliable substitute for TiO_2 and ZnO because of the suitable band gap energy (3.7 eV) as well as the high catalytic activity, chemical stability, nontoxic, and low cost.

The aim of this Postdoctoral Researcher is to elaborate and optimize the physicochemical properties of $ZnWO_4$ thin films by doping with suitable dopants for the application as photocatalyst for the degradation of organic pollutants.

The $ZnWO_4$ thin films will be elaborated by RF magnetron sputtering technique. Materials characterization will include X-ray diffraction (XRD), Raman scattering, UV-VIS spectrophotometer, Scanning Electron Microscopy (SEM), Energy Dispersive X-ray Spectroscopy (EDS), Hall effect and Impedance spectroscopy.

This work will be carried out within the Laboratory of Photovoltaic and Semiconductor Materials at ENIT in collaboration with FEMTO-ST Institute in France.

Supervisor of the research project

Fatma CHAABOUNI
Maître de Conférences LPMS-ENIT

Dr. Fatma Chaabouni
LPMS - ENIT

Supervisor of the research structure

Mohamed BEN RABEH
Maître de Conférences LPMS-ENIT

Mohamed Ben Rabeh
Maître de Conférences
LPMS - ENIT
Gsm: 97 442 362

Ecole Nationale d'Ingénieurs de Tunis
Laboratoire de Photovoltaïque et Matériaux semi-conducteurs

ص ب 37 تونس بلفيدير 1012، الرجمورية التونسية، هاتف 700 874 71-216 فاكس 729 872 71-216 تلكس 15051
PO Box 37, Tunis-Belvedere 1012, Tunisia, Tel: 216-71 874 700, Fax: 216-71 872 729 telex: 15051 TN