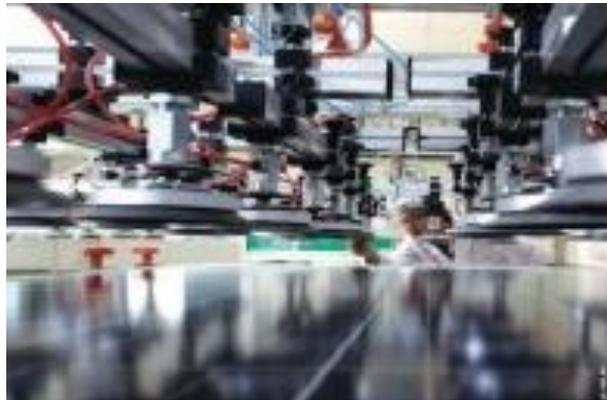


Projet Nanocoating & testing

*Amelioration de la réflexion du CSP pour une
maintenance efficace*



- **COORDINATION**

Université Al Akhawayne- Prof. Asmae KHALDOUNE

- **CONSORTIUM**

**Université Al Akhawayne
Université Abdel Malek Essaadi (FST, Tangier)
Helmholtz-Zentrum Berlin für Materialien und
Energie
SPIE
INDUVER**

- **DUREE DU PROJET**

2 ans

- **BUDGET DU PROJET EN MAD**

Financement IRESSEN: 1 634 595

Investissement global: 2 565 000

- **CONTACTS:**

Prof. Asmae KHALDOUNE / A.khaldoune@ai.ma

Partenaires Scientifiques



Université Al Akhawayne- Ecole d'Ingénierie: Pilotage du projet, mise au point de procédés de synthèse des matériaux ; caractérisation des matériaux, évaluation des performances énergétiques, évaluation des rendements de stockage.

جامعة الأخوين
AL AKHAWAYN
UNIVERSITY



Helmholtz-Zentrum Berlin für Materialien und Energie (HZB, Scientific research institute on structural and solar energy) expertise dans le traitement et déposition: ECD, CBD, ILGAR, EPD et SILAR

HZB Helmholtz
Zentrum Berlin



Université Abdel Malek Essaadi- Faculté des Sciences et Techniques de Tanger: Caractérisation et encadrement au niveau de la structuration des propriétés optiques des couches minces de SiO₂ et Al₂O₃



Partenaires Industriels



SPIE Maroc Rôle important dans la partie électrique et ingénierie liée au projet. Installation des machines et transfert du savoir faire technique .

SPIE



Induver: Rôle important dans la partie miroirs, fourniture, conception, développement et testing.



In this project we will focus our research on the improvement of the quality of Concentrated Solar Power plants by developing new coating materials that are lower in weight, more durable, energy efficient and more cost-effective. Consequently, our aim is to reduce the need of maintenance while improving the mirrors efficiency by the application of special coating on their surfaces.

The aim of this work is to reduce the need of maintenance while improving the mirrors efficiency. The first step in this study is the physico chemical characterization of the surface of usual mirrors used in the CSP plants at geographically diverse sites in Morocco.

In this study a qualitative description of the average temperature–humidity conditions at the various sites and outdoor exposure testing will be routinely performed . In situ data collection of the specular reflectance using a spectrophotometer to determine the loss in reflector’s radiation due to the dust or moisture formation is planned. For this purpose the installation of a small scale CSP module in Ifrane is planned.

A laboratory research of the surface free energy of the reflectors and the surface free energy of interaction of the reflectors with water, salt and dust extracted from different potential CSP plant installations area in Morocco. This study will allow us to conclude about the ability of these surfaces to attract or repel dust and moisture. The surface free energy will be determined from measurements of advancing contact angles of three probe liquids of known surface tension components on the different mirrors and soils platelets using a Goniometer.

During this project we will use substantial analytical and measurement capabilities of our partner at Helmholtz-Zentrum Berlin für Materialien und Energie to develop and test the optical performance and long-term durability of optical materials. Corrosion product found in different mirror will be analyzed and the origin of the corrosion will be identified.

The choice of the subject is also explained by it’s close link to the research interest and background of the faculty involved in the project.

- **Objectifs du projet:**

The aim of this work is to reduce the need of maintenance while improving the mirrors efficiency. The first step in this study is the physico chemical characterization of the surface of usual mirrors used in the CSP plants at geographically diverse sites in Morocco.

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- **Perspectives du projet:**

1. Long term research: Prof. Ennaoui will work together with the partners for the development of advanced functionalized coating materials that can have photocatalytic properties and allowed with daylight to break down organic dirt, to be removed using with little water, minimizing the use of water for cleaning mirrors;
2. During this project Graduate and scientist can visit HZB and gain experience on material processing and characterization. The gain of experience and Know-How and proof of concept will be useful for spin-off and local manufacturing in the MENA region (e.g. Morocco);
3. Al Akhawayn University is an educational institution. The instruments purchased during this project can be used for conducting further research in related areas. In addition, the knowledge acquired by the students, faculty and industrials involved in this project will be transmitted among the Universities and used in projects of development.