

# Method of synthesis of transition metal nitrides and their use when they have two, three or four metals as catalysts for the oxygen evolution reaction

## DISRUPTIVE TECHNOLOGY

A methodology towards the access to metallic nitrides and an specific multimetallic nitride composition with **outstanding properties** as catalyst for the hydrogen production through AEM technology.



## PROBLEM SOLVING

The nitrides market is dominated by single metal nitride formulations. This technology allows access to multimetallic nitrides with 1-4 different metals through very cheap raw materials. The AEM hydrogen production technology still requires a new catalyst to improve its competitiveness versus alternative technologies such as alkaline or PEM.

This catalyst formulation allows the reduction of **hydrogen production costs** through the increase of the catalyst lifetime and the reduction of the energy inputs.



## ADVANTAGES

- Multimetallic nitrides are key materials with outstanding properties for semiconductors, materials and hydrogen production.
- Complete control over nitride composition up to four metals.
- Cost reduction since it requires readily available materials.
- Increase of the catalyst lifetime.
- Reduction of the energy production inputs.



## IP STATUS

Patent application

## BUSINESS MODEL

Licensing (methodology); Spin Off (hydrogen production catalyst)

## TARGET MARKET

Semiconductors, hydrogen production, nitrides manufacturers

## KEYWORDS

Hydrogen, semiconductors, materials, pollution resources, climate change, environment, R&D chemicals, catalysis, energy, nitrides

TRL 3-4  
Experimental  
PoC

## AVAILABILITY

Free to negotiate

### Needs

- Funding for scaling up the technology.
- Optimisation of the methodology for single crystal production (semiconductor requirements).
- Validation of the catalyst in AEM hydrogen production cells in collaboration with an industrial partner.

### Milestones

- Optimisation of single crystal production conditions.
- Process scale-up.
- Validation of catalyst formulation in AEM hydrogen production cells.

### Requirements

- Investment in manufacturing equipment.
- Partnership with AEM technology-based industry.

### Roadmap

- Contact with stakeholders (in semiconductors and hydrogen production) to identify key requirements for further development to transfer the technology.
- Apply for funding to develop the technology according to the stakeholders inputs.
- License the synthetic technology to industrial manufacturers.
- Commercialise the outstanding catalyst formulation for hydrogen production through spin-off creation.

